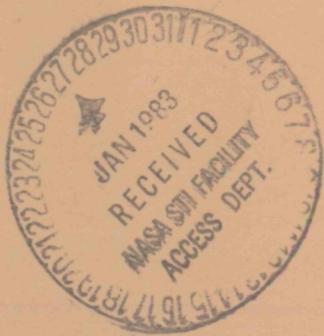




Aerospace Medicine
and Biology
A Continuing
Bibliography
with Indexes

NASA SP-7011(239)
December 1982

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NASA SP-7011(239)

AEROSPACE MEDICINE AND BIOLOGY

**A CONTINUING BIBLIOGRAPHY
WITH INDEXES**

(Supplement 239)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in November 1982 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA)*.



Scientific and Technical Information Branch
National Aeronautics and Space Administration
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This supplement is available as NTISUB/123/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of \$7.00 domestic; \$14.00 foreign.

INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 318 reports, articles and other documents announced during November 1982 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes -- subject and personal author -- are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1982 Supplements.

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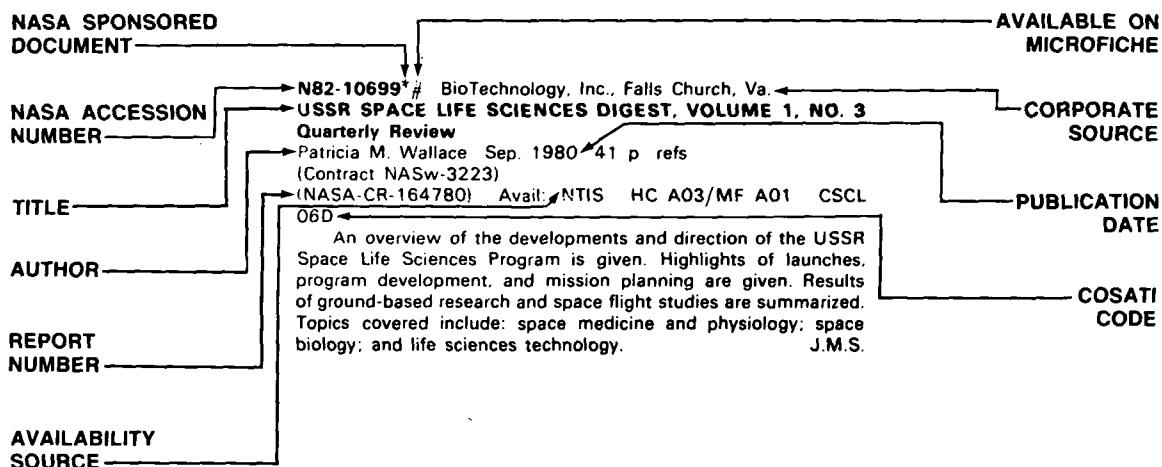
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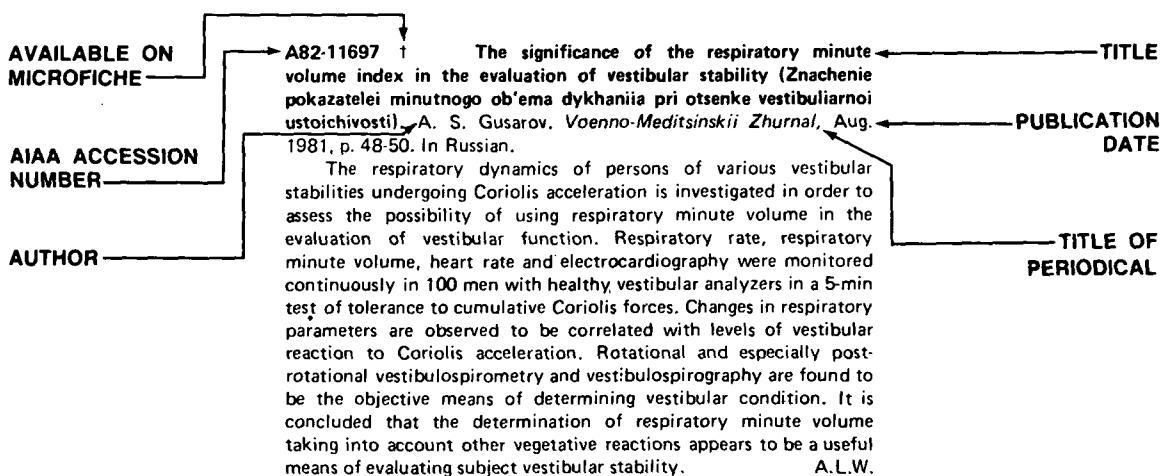
TABLE OF CONTENTS

	Page
IAA ENTRIES (A82-10000)	365
STAR ENTRIES (N82-10000)	379
Subject Index	I-1
Personal Author Index	I-37

TYPICAL CITATION AND ABSTRACT FROM STAR



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AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 239)

DECEMBER 1982

IAA ENTRIES

A82-41665 **Laboratory simulation of interstellar chemical evolution.** K. Kuriki and Y. Ishikawa (Tokyo, University, Tokyo, Japan). *Astrophysical Journal, Part 1*, vol. 259, Aug. 1, 1982, p. 411-422. 26 refs.

A plasma flow experiment has been carried out in the laboratory to simulate the chemical evolution in interstellar and circumstellar clouds. The gas constituents were identified at 7.2 cm downstream from the arc jet exit, and the streamwise distribution of the radiative emission of atomic ions was recorded by an optical multichannel analyzer. The final product in the gas phase was also analyzed with gas chromatography, and a similarity law was derived in order to connect the laboratory flow with the interstellar cloud or circumstellar flow. It was found that the ion-molecule reaction plays an important role in the recombination relaxation. The transition from equilibrium to nonequilibrium state was found in the flow, and some species were found to be localized and constructing spatial patterns in the flow. The relation to Miller's (1953) experiment is discussed.

C.D

A82-41681 **Color coding of information on electronic display devices (Über die Farbcodierung von Informationen auf elektronischen Sichtgeräten).** M. Häusing. Darmstadt, Technische Hochschule, Fachbereich Maschinenbau, Dr.-Ing. Dissertation, 1980. 190 p. 99 refs. In German.

The present investigation is concerned with the determination of colors which can be presented on electronic displays and which can be reproduced as elements of a code with respect to six linguistic categories. The six imaging categories are described by elementary color names of the colloquial language. The terms used are Red, Green, Blue, Yellow, Violet, and Turquoise. The effect of the geometric size of colored signs on the assignment of colors to the considered six nominal categories is investigated. Displays operating according to a television raster procedure are considered. Six color tolerance ranges are isolated, taking into account ranges within which the colors are uniformly classified by many observers with different experience levels as belonging to one of the six color categories.

G.R.

A82-41688 # **An on-line procedure for the extraction of acoustically evoked potentials from the electroencephalogram (Ein on-line Verfahren zur Extraktion von akustisch evozierten Potentialen aus dem Elektroenzephalogramm).** J. Kletti. Karlsruhe, Universität, Fakultät für Elektrotechnik, Dr.-Ing. Dissertation, 1980. 178 p. 40 refs. In German.

Audiometry is concerned with the determination of the hearing ability of a human being. An objective audiometry method is based on the evaluation of the electroencephalogram (EEG). EEG audiometry is also called Electric Response Audiometry (ERA). The employment of ERA involves a utilization of the behavior of the brain to produce specific bioelectric responses in case of an arrival or peripheral stimuli of tactile, optical, or acoustic characteristics. These bioelectric responses are called evoked potentials. The foundations of objective audiometry are discussed along with the currently employed methods of this approach. A description is presented of a new procedure which makes it possible to eliminate the disturbing factors which are mainly observed in connection with the derivation of evoked potentials. The new procedure is based on a utilization of the averaging method. Attention is given to results obtained with the considered method and the realization of an ERA computer.

G.R.

A82-41699 # **A command and control device for a man-machine system - Fabrication of a platform and trials (Dispositif de contrôle et de commande d'un système homme-machine - Réalisation d'une plate-forme et essais).** P. Mangin. Valenciennes et Hainaut-Cambrésis, Université, Docteur (3e cycle) Thesis, 1980. 131 p. 56 refs. In French.

The parameters, mechanics, construction, operation, and performance of a motion simulator suitable for testing pilot visual functions and task performance

while undergoing dynamic movements are reported. An electrohydraulic actuator system was chosen after an analysis of existing machinery and consideration of the inclusion of three axes of rotation into the system. The human subject sits in the center of a platform and is exposed to visual stimuli while the chair moves on three axes, and certain tasks must be performed. Subjects were initially exposed to pitching motions of varying durations. Reaction time to the appearance of visual cues and subsequent task performance were measured and statistical analyses are presented. The chair, with movements proceeding along preprogrammed lines, is concluded to be effective for modification of tasks requiring visual stimuli, and also determining the range, amplitude, and frequency of vestibular disturbances transmitted to the pilot by motions.

M.S.K.

A82-41808 **An analog tracking filter for a swept-sine human vibration test.** M. S. Hundal and B. B. Woodworth (Vermont, University, Burlington, VT). In: *International Instrumentation Symposium, 27th*, Indianapolis, IN, April 27-30, 1981, Proceedings. Part 2. Research Triangle Park, NC, Instrument Society of America, 1981, p. 515-520. PHS-sponsored research.

The theory, design and construction of a tracking filter are presented. The filter is used for the accelerometer signals from a swept-sine human vibration test. Without the filter the signals contained high harmonic content which rendered the determination of frequency response difficult and error prone. The filter is based on a second order low pass circuit consisting of two integrators, a summer and a sign inverter. The frequency of the filter is continuously varied to keep it tuned to the driving frequency. The frequency variation is obtained by inserting a multiplier at the input of each integrator; the former are supplied by a ramp voltage proportional to the frequency.

(Author)

A82-42065 # **Principles of biological and medical climatology (Основы медитинской и биологической климатологии).** N. M. Voronin. Moscow, Izdatel'stvo Meditsina, 1981. 352 p. 200 refs. In Russian.

The effect on the body of weather, climate, and season is considered, together with the effect of diurnal changes in weather. The theoretical assumptions are expounded, and the way in which natural factors can be used in the prevention and cure of disease is discussed. Attention is also given to the way in which deleterious environmental factors can be neutralized.

C.R.

A82-42078 # **An investigation of the mechanical meaning of the surface electromyogram (Contribution à l'étude de la signification mécanique de l'électromyogramme de surface).** M. Boulangé. Lille I, Université, Docteur (3e cycle) Thesis, 1980. 175 p. 126 refs. In French.

The relation between the force developed by a muscle during voluntary contractions and its electromyographic activity is investigated by experiments conducted on rat gastrocnemius muscles. The muscle is activated by nerve stimulation and the electromyogram (EMG) is detected by means of surface electrodes. The relation between the EMG and the force developed at the time of the tetanic contractions simulates the spatial and temporal recruitment of the motor units. The interpretation of the EMG-force relation is completed by analyzing the histological profiles of the two heads of the muscle and studying the potentials collected in the course of the muscular contractions. Results show that the diameter of the same type of fibers varies according to the regrouping and to the location of the fibers in the muscle. The spatial recruitment of the motor units is clearly evident at the time of voluntary contractions. The influence of the stimulation frequency is more complex than the temporal recruitment at the time of voluntary movement. Finally, the EMG-force relation is found to be curvilinear, with at first a small slope, reflecting the activity of the slow motor units, but then it becomes steeper due to the activity of both the slow and rapid motor units.

N.B.

A82-42080 # **An examination of heat exchanges in man - Establishment of a reference technique for measuring average cutaneous temperatures using infrared thermometry (Contribution à l'étude des**

A82-42083

échanges thermiques chez l'homme - Détermination d'une méthode de référence pour la mesure des températures cutanées moyennes par thermométrie infra-rouge. J.-L. Lecroart. Lille I, Université, Docteur (3e cycle) Thesis, 1980. 102 p. 41 refs. In French.

The development of a method for establishing the average cutaneous temperature in a nonempirical manner using IR thermometry is reported. A numerical model of heat exchanges between the skin and the ambient environment is presented and classical formulas for calculating the average cutaneous temperature are reviewed, showing that recorded discrepancies from test to test are due to arbitrary choices of locations for the placement of thermocouples. IR thermometric scans of the whole body are demonstrated to yield maps of the electromagnetic radiation emitted by the body through the skin, with different temperatures expressed as different gray levels. The scan is performed without touching the person, and techniques for accounting for the intervening medium and the angle of view are explored. Specific points of temperature are found by weighting the scanned temperature with a coefficient representing the total area of the measurement around that site.

M.S.K.

A82-42083 # The effects of the direction of attention on the transmission of cutaneous information (Effets de la direction de l'attention sur la transmission des messages cutanés). J. Honore. Lille I, Université, Docteur (3e cycle) Thesis, 1980. 99 p. 86 refs. In French.

An experimental investigation of the modulation of cutaneous excitation impulses during performance of a task requiring a particular bodily orientation and attention focus are presented. Subjects (right-handed only) were exposed to electrical current stimulation at internal popliteal or the external malleolar region. The afferent pulses were applied at 330 Hz, with variations in intensity and duration. The intensity of the stimuli was expressed as a function of the psychophysiological standard of unity, which marks the response threshold. The subjects were then tested during two tasks while intermittent stimulation continued: moving dots on a display screen to the same level or fixating on a target area dot on the screen while the head was held in a steady position. Subjects were asked to count the number of stimuli they received during the trial period. It was found that the stimuli were detected better when the attention was directed toward the same side of the visual field as the side of the body which was stimulated. The results confirm that orientation of the optical attention is important even when stimuli occur which do not require visual attention.

M.S.K.

A82-42087 # Thermography and microwave heating - The design and fabrication of systems intended for biological and medical use (Thermographie et chauffage microonde - Contribution à la conception et à la réalisation de systèmes destinés au génie biologique et médical). D. D. Nyguen. Lille I, Université, Docteur (3e cycle) Thesis, 1980. 137 p. 65 refs. In French. Research supported by the Délégation Générale à la Recherche Scientifique et Technique and Caisse Nationale de l'Assurance des Traveleurs Salariés.

Applications of thermographic sensors for measuring subdermal heat fluxes and as control sensors in the use of microwaves for hyperthermic cancer treatment are described. The development of a monomode rectangular waveguide for measuring nontraumatic subcutaneous temperature of living tissues is modeled numerically. Optimization is defined to minimize the reflection coefficient at the skin-sensor interface and maximize the coupling between the waveguide and the coaxial connector. It is shown that, in the 1-10 GHz range, a weak microwave signal caused by warmth can pass through thick layers of adipose tissue or bone, and up to 1.5 cm through high water content tissue, such as muscles. The fabrication of a microwave sensor operating at 2-4 GHz as a tumor detector through observation of temperature gradients which indicate the presence of a cancerous mass is reported. Techniques for heating the tumors to destroy them, while simultaneously monitoring to assure that interior temperatures do not exceed 43 C are detailed.

M.S.K.

A82-42090 # An analysis and modeling of the binocular system in human sagittal vision (Analyse et modélisation du système binoculaire en vision sagittale chez l'homme). J. L. Edme. Lille I, Université et Valenciennes et Hainaut-Cambrésis, Université, Docteur (3e cycle) Thesis, 1980. 182 p. 43 refs. In French.

An analysis of ocular movements in humans is presented and a model for binocular vergence is developed. An experimental device for tracking the positions of the eyes following a moving object is described, noting the confinement of the stimuli to the sagittal plane of vision. An oculometer was devised which recorded the eye motions, with the signal being analyzed by a computer as to the changing angles of the position of the eyes, which were focused on a target being maneuvered on a screen. A total of 17 subjects were exposed to trials which required vergence of the eyes at angles of 4.5, 7, 9.5, and 12 deg. Curves of amplitude and dephasing were generated of the oculomotor response to a sinusoidal stimulus. Vergence was found to be particularly important to the functioning of saccadic eye movements. A frequency of visual cut-off was found to exist, at which movement could not be tracked. The binocular system was modeled as a coupled system, linked in positioning and behaving nonlinearly.

M.S.K.

A82-42171 # Current problems in hypobiosis (Aktual'nye voprosy gipobioza). N. N. Timofeev (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Patologicheskaiia Fiziologii i Eksperimental'naia Terapiia*, July-Aug. 1982, p. 39-48. 57 refs. In Russian.

A review of recent research concerning hypobiosis, the slowing down of the life processes of warm-blooded animals and humans over an extended period of time, is presented. It is concluded in a summary of research concerning attempts to produce an analog of natural hypobiosis by prolonged hypothermia that the use of traditional pharmacological substances, such as narcotics and neuroleptic mixtures, is unlikely to produce an acceptable artificial hypobiosis in the foreseeable future. A better approach is suggested to lie in the search for substances which alter the neurohumoral regulation of warm-blooded animals in ways similar to the changes in these processes shown in animals during hibernation. Results of recent research concerning the biological mechanism of hypobiosis show the neurochemical basis of the processes of chemical thermoregulation. The fundamental link in this mechanism is found to be the role of the catecholamine system.

N.B.

A82-42172 # Changes in the transaminase activity and several biochemical blood values in the acute period of experimental myocardial infarction in monkeys (Izmeneniiia transaminaznoi aktivnosti i nekotorykh biokhimicheskikh pokazatelei krovi v ostrom perioode eksperimental'nogo infarkta miokarda u obezeyan). N. I. Lemondzhava and G. S. Belkania (Akademiia Meditsinskikh Nauk SSSR, Sukhumi, Georgian SSR). *Patologicheskaiia Fiziologii i Eksperimental'naia Terapiia*, July-Aug. 1982, p. 53-56. 11 refs. In Russian.

A82-42173 # The dynamics of the development of postischemial cerebrovascular phenomena during the perfusion of the cerebral vessels with a stable volume of blood (Dinamika razvitiia postischemicheskikh tserebrovaskularnykh fenomenov v usloviakh perfuzii mozgovykh sushod stabil'nym ob'emon' krovi). M. D. Gaevyi, Zh. V. Sankina, Ch. K. Tkhak, and T. V. Sankina (Piatigorskii Farmatsevicheskii Institut, Piatigorsk, USSR). *Patologicheskaiia Fiziologii i Eksperimental'naia Terapiia*, July-Aug. 1982, p. 61-64. 13 refs. In Russian.

A82-42174 # The influence of prostaglandins and polyunsaturated fatty acids on the corticosteroid metabolism of normal and spontaneously hypertensive rats (Vliyanie prostaglandinov i polinenasyshchennykh zhirnykh kislot na metabolizm kortikosteroidov u normotenzivnykh i spontannno gipertenzivnykh krys). A. G. Kucherenko and Kh. M. Markov (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Patologicheskaiia Fiziologii i Eksperimental'naia Terapiia*, July-Aug. 1982, p. 69-72. 19 refs. In Russian.

A82-42175 # The interrelationship of the function of the blood kallikrein-kinin system with the main parameters of central hemodynamics during hypertension (Vzaimosviaz' funktsional'nogo sostoiania kallikrein-kininovoi sistemy krovi s osnovnymi parametrami tsentral'noi gemodinamiki pri gipertenziveskoi bolezni). V. V. Karpitskii (Ialitinskii Nauchno-Issledovatel'skii Institut Fizicheskikh Metodov Lecheniya i Meditsinskoi Klimatologii, Yalta, Ukrainian, SSR.) *Patologicheskaiia Fiziologii i Eksperimental'naia Terapiia*, July-Aug. 1982, p. 86-89. 11 refs. In Russian.

A82-42196 # Logistics support productivity improvement. R. A. Boening, G. A. Mohr, Jr., and V. B. Morris, Jr. (Westinghouse Electric Corp., Baltimore, MD). In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 227-232.

Five current research and development projects in Westinghouse Integrated Logistics Support Division which contribute to improved productivity and enhanced quality in logistics support are described. The projects range widely over the field of logistics support. Combined interactive training, technical manuals and ATE; voice control of ATE; automated conversion of photographs to line drawings; a compact laser range simulator; and computerized reading grade level determination are discussed.

(Author)

A82-42230 # Training and personnel impact on increased productivity. C. H. Duffee (Martin Marietta Aerospace, Orlando, FL). In: Annual Reliability and Maintainability Symposium, Los Angeles, CA, January 26-28, 1982, Proceedings. New York, Institute of Electrical and Electronics Engineers, 1982, p. 497-503. 11 refs.

Test data are presented from an evaluation of the impact of novel training methods on operation and maintenance personnel performance. Extension Training Material (ETM) lessons allowed the test group to overcome the experience advantage of a control group, and then outperform the control group in every criterion measured. A 31% reduction in performance time and a 59% error reduction is reported. The ETM lessons are multimedia, programmed instructional training materials which include audiovisual, highly illustrated print, and audio tape components. Media selection for each lesson is based on audience learning skill as well as task characteristics. Learning retention is enhanced as

a result of the integration of more of the user's five senses into the learning process.

O.C.

A82-42600 \dagger Activation of lipid peroxidation during stress in man, evaluated according to the content of pentane in expired air (Aktivatsiya perekisnogo okisleniya lipidov pri stresse u cheloveka, otsenivaemaya po soderzhaniiu pentana v vydykhaemom vozdukhe). L. L. Prilipko, O. N. Orlov, S. M. Ivanova, B. E. Kagan, F. Z. Meerson, and A. S. Ushakov (Akademiiia Meditsinskikh Nauk SSSR; Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem; Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Akademiiia Nauk SSSR, Doklady*, vol. 265, no. 4, 1982, p. 1010-1013. 14 refs. In Russian.

A82-42601 \dagger Features and variations of the local hematocrit (Osnobnosti i izmeneniia mestnogo gematokrita). G. I. Mchedlishvili (Akademiiia Nauk Gruzinskoi SSR, Institut Fiziologii, Tbilisi, Georgian SSR). *Akademiiia Meditsinskikh Nauk SSSR, Vestnik*, no. 7, 1982, p. 87-95. 30 refs. In Russian.

Studies of the local variation in the hematocrit, the volume percentage of erythrocytes in the whole plasma, are reviewed, and methods for both direct and indirect determination of the local hematocrit are discussed. It is concluded that two related phenomena contribute to the observed local variation in the hematocrit. First, a relative decrease can occur in the number of erythrocytes in the microvessels as compared to those present in the central circulatory system. Second, variation in the local hematocrit can occur according to the rate of local circulation, which is associated with the nonuniform distribution of erythrocytes and plasma in the sequence of arterial branches beginning with the aorta. Also presented is a discussion of the possible physiologic and pathologic implications of the local variations in the hematocrit.

N.B.

A82-42602 \dagger New methodological aspects of the investigation of organ specificity of the lymphatic pathways (Novye metodicheskie aspekty izucheniiia organnoi spetsifichnosti limfonosnykh putei). Iu. E. Vyrakov and E. L. Soboleva (Tsentral'nyi Institut Usovershenstvovaniia Vrachei, Moscow, USSR). *Akademiiia Meditsinskikh Nauk SSSR, Vestnik*, no. 7, 1982, p. 84-87. 17 refs. In Russian.

Replicas of the lymphatic pathways of the microvascular beds of various organs of humans, dogs, and rats are studied by scanning electron microscopy. The results provide for the three dimensional visualization of the lymphatic microvessels, both capillaries and post-capillary segments, in various organs, such as the heart, liver, kidney, and lungs, and demonstrate their considerable structural diversity. The organ specificity of the lymphatic microcirculatory bed is examined. In addition, it is suggested that the terminology used to designate various segments of the lymphatic pathway be clarified and standardized.

N.B.

A82-42603 \dagger The contraction, regulation, and functional role of lymph vessels (Sokrashcheniya limfaticeskikh sosudov, ikh reguliatsiya i funktsional'naia rol'). R. S. Orlov and R. P. Borisova (Leningradskii Sanitarno-Gigienicheskii Institut, Leningrad, USSR). *Akademiiia Meditsinskikh Nauk SSSR, Vestnik*, no. 7, 1982, p. 74-83. 11 refs. In Russian.

The contractile activity of isolated segments of the main lymph vessels, as expressed in spontaneous phasic rhythmic contractions, slow waves, and variations in tone, is studied in rats, guinea pigs, and sheep. Results show that the contraction produced by myocytes in response to stimulation of various intensities is found to be of the quantal type, depends on the stretching force, and also shows various forms of rhythmic dependence. The pacemaker of a section of a lymph vessel between valves optimizes the rhythm and amplitude of the contraction according to the temperature and ionic composition of the medium, intravascular pressure, etc. In addition, the sections of the major lymph vessels between valves possess both inhibitory and excitatory nerves. It is concluded that the combination of phasic and tonic myocytes allows the lymph vessels to function like the heart and blood vessels, which enables them to cope with both the pumping of the lymph and variations in the capacity of their own vessels.

N.B.

A82-42604 \dagger Circulation and energetics of forearm muscles in man (Krovoobrashchenie i energetika myshts predplech'ia cheloveka). Ia. V. Skards, A. O. Paegilis, and D. R. Matisone (Latviiskii Nauchno-Issledovatel'skii Institut Kardiologii, Riga, Latvian SSR). *Akademiiia Meditsinskikh Nauk SSSR, Vestnik*, no. 7, 1982, p. 65-74. 20 refs. In Russian.

Mechanisms are examined whereby a long-term equilibrium can be achieved between the rates of ATP metabolism and aerobic resynthesis of phosphagens during voluntary contraction of forearm muscles in static conditions. It is shown that such an equilibrium can be achieved only if the entire additional blood flow is directed toward those muscle fibers which are active at a given moment. An increase in the relative force of contraction, a reduction in regional arterial blood pressure, or a decrease in the oxidative phosphorylation efficiency will lead to a cumulative activation of aerobic phosphagen resynthesis, inhibition of mechanisms responsible for blood flow redistribution, hemodynamic and metabolic shunting of active muscle fibers, and an abrupt decrease in working capacity.

V.L.

A82-42605 \dagger The coronary vessels and the contractile apparatus of the myocardium in immune heart damage /Histochemical and ultrastructural studies/ (Koronarnye sosudy i sokratitel'nyi apparat miokarda pri immunnom povrezhdenii serdtsa /Gistokhimicheskie i ultrastrukturnye issledovaniia/). A. A. Moibenko and L. F. Popovich (Akademiiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Akademiiia Meditsinskikh Nauk SSSR, Vestnik*, no. 7, 1982, p. 58-64. 52 refs. In Russian.

A82-42606 \dagger Analysis of load characteristics and development of new indicators of cardiac function (Analiz nagruzochnykh kharakteristik i razrabotka novykh pokazatelei funktsional'nogo sostoiania serdtsa). Ts. R. Orlova, M. P. Sakharov, S. E. Ragimov, V. A. Shlain, and A. V. Trubetskoi (Akademiiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Akademiiia Meditsinskikh Nauk SSSR, Vestnik*, no. 7, 1982, p. 48-58. 27 refs. In Russian.

The load characteristics of the heart have been investigated using a mathematical model and experimental data on intact cat hearts. It is found that the loading characteristics, represented as a relationship between the peak values of intraventricular pressure and blood flow in the aorta, are close to linear and can be described by two parameters: the force parameter (maximum pressure at zero blood flow) and the rate parameter (maximum blood flow at zero pressure). The load characteristics are largely determined by the viscoelastic properties of the left ventricle. The possibility of using these parameters as indicators of cardiac function is discussed.

V.L.

A82-42607 \dagger The effectiveness of neurohumoral influences on pulmonary circulation (Effektivnost' neirogumoral'nykh vliyanii na legochnoe krovoobrashchenie). D. P. Dvoretorskii and B. I. Tkachenko (Akademiiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Akademiiia Meditsinskikh Nauk SSSR, Vestnik*, no. 7, 1982, p. 39-48. 46 refs. In Russian.

Changes in the resistance and capacity of pulmonary vessels in response to the activation of sympathetic and parasympathetic pulmonary nerves and to introduction of acetylcholine, serotonin, and histamine into the pulmonary circulation system were studied in cats and rabbits. Results indicate that vasoconstrictor activity in the lungs has a relatively weak effect on integral lung circulation indicators, while neurohumoral control of regional blood flow distribution in the lungs is fairly effective. These findings are explained in terms of local and regional differentiation of the biophysical properties of lung tissue and gravitational influences on the distribution pattern of blood flow in the lungs. Acetylcholine, serotonin, and histamine are shown to increase the postcapillary resistance of the pulmonary vascular bed to a greater extent than they increase the precapillary resistance.

V.L.

A82-42608 \dagger Emotional stress and hypokinesia in the origination of cardiac disorders and hypertensive states (Emotsional'noe napriazhenie i gipokinezia v geneze narushenii serdechnoi deiatel'nosti i giperintenzivnykh sostoianii). B. M. Fedorov (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *Akademiiia Meditsinskikh Nauk SSSR, Vestnik*, no. 7, 1982, p. 33-39. 27 refs. In Russian.

A biotelemetric monitoring system has been used to study the cardiac activity of man under emotional stress and various degrees of motor activity in both simulated and real-life situations. The results of the study indicate that prolonged hypokinesia increases the susceptibility of man to stress reactions, leads to excessive stimulation of the circulatory system, and inhibits depressor reflexes, which can produce a prolonged increase in arterial blood pressure. Normalization of circulation on termination of emotional stress is delayed under the conditions of hypokinesia.

V.L.

A82-42609 \dagger Blood circulation and aging (Krovoobrashchenie i starenie). V. V. Frol'kis (Akademiiia Meditsinskikh Nauk SSSR, Kiev, Ukrainian SSR). *Akademiiia Meditsinskikh Nauk SSSR, Vestnik*, no. 7, 1982, p. 24-33. 30 refs. In Russian.

It is noted that the changes brought about in the heart and blood vessels by aging pave the way for cardiovascular pathologies, among them atherosclerosis, arterial hypertension, ischemic diseases of the heart, and cardiac insufficiency. Attention is given to hemodynamics and the contractility of the heart, to efferent neurohumoral regulation of the cardiovascular system, and to the regulation of coronary circulation in old age. It is found that the hemodynamic center becomes excitatory, that neural adrenergic and cholinergic influences become weaker, and that shifts occur in the sensitivity of the heart and blood vessels to humoral factors. Taken as a whole, these changes are seen as hampering the adaptability of the circulatory system.

C.R.

A82-42610 \dagger A systems analysis of individual vascular reactions in animals under experimentally induced emotional stress (Sistemnyi analiz individual'nykh sosudistnykh reaktsii zhivotnykh v usloviakh eksperimental'nogo emotsional'nogo stressa). K. V. Sudakov (Akademiiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Akademiiia Meditsinskikh Nauk SSSR, Vestnik*, no. 7, 1982, p. 11-24. 18 refs. In Russian.

On the basis of the theory of functional systems propounded by Anokhin

A82-42611

(1970), an approach that allows for individual responses to emotional stress is discussed. Data are presented on the individual vascular reactions of animals faced with the same type of threatening situation. It is shown that both in animals resistant to changes in blood pressure under emotional stress and in those predisposed to such changes, the distribution of catecholamines in the brain differs from individual to individual. It is also shown that, in animals exhibiting differing degrees of resistance to emotional stress, the morphological and histochemical changes in the ganglia of the involuntary system are peculiar to each individual.

C.R.

A82-42611 † Biomicroscopy of a microcirculatory bed in experiments - Possibilities, limitations, and prospects (Biomikroskopiia mikrosirkuliarnogo russia v eksperimente - Vozmozhnosti oganicheniiia, perspektivi). A. M. Chernukh (Akademiiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Akademiiia Meditsinskikh Nauk SSSR, Vestnik*, no. 7, 1982, p. 3-11. 13 refs. In Russian.

The experience gained in studying microcirculation in various organs underlines the importance of taking into consideration the microcirculatory bed, along with the nearby cell formations. Using contact luminescent biomicroscopy in investigations of permeability, data are obtained on the gradient of vascular permeability and on the role of venular and lymphatic microvessels in regulating tissue homeostasis. The homeostasis is regulated at the level of the functional element of an organ where the ultrafine structure of the microvessel wall is not uniform. It is noted that further improvements in biomicroscopy have come from the use of the television microscope and from analyses of the television images. Biomicroscopic studies are found to yield fuller results when the tissue is afterwards subjected to a morphological study. Techniques of high-speed microcinematography and lasers are seen as promising.

C.R.

A82-42612 † Experimental study of the combined effect of noise and acetone (Eksperimental'noe izuchenie kombinirovannogo deistviia shuma i atsetona). L. N. Burykina, V. L. Ponomareva, V. P. Kurnaeva, A. P. Red'kin, E. V. Shmeleva, E. V. Varsanovich, A. D. Dasaeva, and N. K. Demokidova (Akademiiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Gigiena Truda i Professional'nye Zabolevaniiia*, July 1982, p. 48-51. 11 refs. In Russian.

The combined effect of noise and acetone was studied in male Wistar rats. Rats that were exposed to the separate effects of acetone at low but active levels and noise at a level of 85 dB in the course of one month and a half were found to exhibit single-type nonspecific changes primarily in the neuroendocrine system. The combined effect of acetone and noise was found to be less than additive for all of the physiological indices studied, and close to antagonistic for some of these indices.

B.J.

A82-42613 † The state of hemodynamics under the effect of laser radiation (Sostoianie gemodinamiki pri deistviu lazernogo izlucheniia). I. N. Ushkova, L. A. Pokrovskaya, and I. M. Suvorov (Akademiiia Meditsinskikh Nauk SSSR, Leningrad). *Gigiena Truda i Professional'nye Zabolevaniiia*, July 1982, p. 44, 45. In Russian.

Experiments were conducted to evaluate the state of systemic blood circulation in operators of He-Ne lasers. Mechanocardiography showed that operators of He-Ne lasers with output powers of 2-8 mW exhibited lower-than-normal levels of arterial pressure combined with lower-than-normal values of blood minute volume and insufficient increases of peripheral resistance, or combined with constant blood minute volume and decreased peripheral resistance. Laser radiation tends to produce hypotension, accompanied by a reduction in blood minute volume at a constant peripheral resistance.

B.J.

A82-42614 † The condition of the cardiovascular system in air traffic controllers according to data acquired at the workplace (Sostoianie serdechno-sosudistoi sistemy u aviationsionnykh dispetcherov po dannym obследovaniia na rabochem meste). Sh. T. Avetikian and E. L. Kan (Nauchno-Issledovatel'skii Neirokhirurgicheskii Institut, Leningrad, USSR). *Gigiena Truda i Professional'nye Zabolevaniiia*, July 1982, p. 40, 41. In Russian.

A82-42615 † The effect of general vibration combined with intermittent noise on the human auditory function (Deistvie obshchei vibratsii v sochetanii s preryvistym shumom na slukhovuiu funktsiu cheloveka). N. T. Svistunov and L. N. Marchenkova. *Gigiena Truda i Professional'nye Zabolevaniiia*, July 1982, p. 35, 36. 5 refs. In Russian.

A82-42616 † Early clinical manifestations of vibration-noise pathology in miners of Donets Basin (O rannikh klinicheskikh proiavleniiakh vibratsionno-shumovoi patologii u gornorabochikh Donbassa). M. L. Velskaya, M. A. Nekhorosheva, G. I. Grishanova, N. G. Simonian, A. M. Marin, E. A. Smirnova, and V. I. Dzherelei (Institutu Gigienny Truda i Profzabolevanii, Donetsk, Ukrainian SSR). *Gigiena Truda i Professional'nye Zabolevaniiia*, July 1982, p. 19-21. In Russian.

A82-42617 † A physiological justification of allowable noise levels in work involving heavy physical labor under nervous stress (Fiziologicheskoe obosnovanie dopustimykh urovnei shuma pri tiazhelom fizicheskom nervno-napravleniiem trude). G. S. Zvereva, M. V. Ratner, A. V. Kolganov, and L. V. Mar'enko (Institut Gigienny Truda i Profzabolevanii, Donetsk, USSR). *Gigiena Truda i Professional'nye Zabolevaniiia*, July 1982, p. 7-11. In Russian.

It is found that, as reflected by physiological indicators, heavy physical labor, noise, and nervous stress conditions act synergistically. The effect of noise in bringing about additional shifts in the physiological indicators is found to be more pronounced than that of physical labor or nervous stress.

C.R.

A82-42618 † Levels of physiological reserves of sailors working a 10-hour shift (Urovni fiziologicheskikh rezervov organizma morsikov, rabotaiushchikh po 10-chasovomu grafiku). V. N. Evstaf'ev, L. M. Shafran, and O. I. Netudikhatka (Institut Gigienny Vodnogo Transporta, Odessa, Ukrainian SSR). *Gigiena Truda i Professional'nye Zabolevaniiia*, July 1982, p. 4-7. 10 refs. In Russian.

A82-42619 † Studies directed toward improving hygienic standards pertaining to total-body vibration resulting from heavy moving equipment (Materialy utochneniiu gигиенических норм obshchei transportno-tehnologicheskoi vibratsii). Iu. P. Pal'tsev, Iu. P. Syromiatnikov, A. M. Vialov, E. M. Abramova, T. A. Shabolina, and E. L. Sineva (Institut Gigienny, Moscow, USSR). *Gigiena Truda i Professional'nye Zabolevaniiia*, July 1982, p. 1-4. In Russian.

Tests were conducted on excavator operators in order to define safe levels of total-body vibration for operators of heavy moving equipment. Simulation experiments revealed the adverse effect of low-frequency vibration (108 dB in the octave band with a geometric mean frequency of 4 Hz) on the total and regional cerebral hemodynamics. It is concluded that safe working conditions can be attained if vibration levels at workplaces do not exceed values corresponding to LS (limiting spectrum) 92.

B.J.

A82-42620 † Principles of the definition and classification of tissues (Printsipy opredelenia i klassifikatsii tkanei). A. A. Bazitov (Vladivostokskii Meditsinskii Institut, Vladivostok, USSR). *Arkhiv Anatomii, Gistologii i Embriologii*, vol. 82, June 1982, p. 92-100. 30 refs. In Russian.

A number of questions pertaining to the definition and classification of tissues are addressed, including difficulties in defining the concept of tissue, general principles underlying the classification of tissues, the relationship between criteria of definition and classification, and the place that the term 'tissue' occupies among other biological terms. It is suggested that contemporary histological description is based on two classifications of tissues, which are complementary: morphophysiological and genetic.

B.J.

A82-42621 † The organization of the afferent subcortical inputs of the visual region of the cat cerebrum (Organizatsii afferentnykh podkor'kovykh vkhodov zritel'noi oblasti kory bol'shogo mozga u koshki). G. P. Obukhova (Akademiiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Arkhiv Anatomii, Gistologii i Embriologii*, vol. 82, June 1982, p. 17-21. 15 refs. In Russian.

A82-42622 † Stereological analysis of interneuronal contacts in the cerebral cortex of rats during the posthypoxic period (Stereologicheskii analiz mezhneironal'nykh kontaktov kory bol'shogo mozga krys v postgipoksiceskom periode). S. S. Stepanov, V. V. Semchenko, and Iu. V. Cheskakov (Omskii Meditsinskii Institut, Omsk, USSR). *Arkhiv Anatomii, Gistologii i Embriologii*, vol. 82, June 1982, p. 12-16. 16 refs. In Russian.

The effect of hypoxia on the ultrastructure and number of synapses in the neocortex of white rats was studied by the selective staining of the interneuronal contacts. Asphyxia lasting 6 min results in a considerable decrease in the number of synapses. Reparation during the posthypoxic period occurs at the cost of hypertrophy of the contacts and the activation of neosynapsogenesis. The considerable decrease in the number of synapses (by 31%) was maintained one month after the asphyxia, with a considerable change in the synapoarchitecture.

B.J.

A82-42623 † Changes in the lymphoid organs of rats under the effect of acute hypoxia (Izmeneniiia v limfoidnykh organakh u krys pri ostroii gipoksiii). A. M. Nalivaiko (Sverdlovskii Meditsinskii Institut, Sverdlovsk, USSR). *Arkhiv Anatomii, Gistologii i Embriologii*, vol. 82, June 1982, p. 87-91. 21 refs. In Russian.

Changes in the thymus, spleen, and mesenteric lymph nodes in rats under acute hypoxia that simulates the effect of elevations of 7000 m above sea level for 1 hour and 6500 m above sea level for 6 hours are investigated using histological and cytofluorometric methods. The migration of differentiated lymphocytes out of the lymphoid organs is found to increase, with essential shifts occurring in the temporal parameters in the mitotic cycle of the lymphocytes. The contents of nucleic acids in the lymphoid cells is found to change. The hypoxia is thus seen as intensifying differentiation processes.

C.R.

A82-42624 † The anatomy and topography of the human bronchopulmonary lymph nodes (Anatomiiia i topografiiia bronkholegichnykh limfati-

cheskikh uzlov u cheloveka). A. B. Aubakirov (I Moskovskii Meditsinskii Institut, Moscow, USSR). *Arkhiv Anatomii, Gistologii i Embriologii*, vol. 82, June 1982, p. 84-87. 11 refs. In Russian.

A82-42625 ↑ **The topography of elements of the cardiac conduction system (Topografiia elementov provodiaschchei sistemy serdtsa cheloveka).** S. S. Mikhailov and A. V. Churbar (Moskovskii Meditsinskii Stomatologicheskii Institut, Moscow, USSR). *Arkhiv Anatomii, Gistologii i Embriologii*, vol. 82, June 1982, p. 56-67. 25 refs. In Russian.

A total of 112 heart preparations from persons ranging in age from 18 to 87 is studied. A number of fasciculi connected with the sinoatrial and atrioventricular nodes are revealed. The atrioventricular part of the conduction system is seen as having a structure and topography that is not subject to variation. The sinoatrial part, being younger in a phylogenetic sense, is more susceptible to variation.

C.R.

A82-42626 ↑ **Microcirculatory state in the case of chronic obliteration of arteries (Sostoianie mikrotsirkulatornogo rusla pri khronecheskoi obliteratsii arterii).** P. F. Bytka, V. T. Zhitsa, and E. T. Chikale (Klinika Gospital'noi Khirurgii, Kishinevskii Meditsinskii Institut, Kishinev, Moldavian SSR). *Arkhiv Anatomii, Gistologii i Embriologii*, vol. 82, June 1982, p. 49-55. 13 refs. In Russian.

A82-42627 ↑ **A morphological investigation of the regulatory mechanisms of the intracerebral blood circulation (Morfologicheskie issledovaniia regulatorynykh mekhanizmov vnutrimozgovogo krovoobrashcheniya).** P. A. Motavkin, V. M. Chertok, and Iu. I. Pigolkin (Vladivostokskii Meditsinskii Institut, Vladivostok, USSR). *Arkhiv Anatomii, Gistologii i Embriologii*, vol. 82, June 1982, p. 42-49. 35 refs. In Russian.

The intracerebral branches of the posterior and medial cerebral arteries in the region of the gray and white substances of the parietal, occipital, and temporal cerebral lobes, and in the nuclei of the superior and inferior colliculi in the tectum mesencephali, as well as in the pons, were studied in 36 male corpses (from 5-49 years of age) by the methods of Cajal, Koelle, Furness, and Costa. Results show the presence of sensory nerve endings of the cholinergic plexuses in the walls of the intracerebral arteries with a diameter of up to 100 microns and greater, and adrenergic neural networks in arteries up to 40 microns in size and larger. It is suggested that the nerve and other systems of the intracerebral circulatory bed play a role in the regulation of the local cerebral circulation.

N.B.

A82-42628 ↑ **Characteristics of pharmacotherapeutic complications in otolaryngology /Review of the literature/ (Osobennosti oslozhnenii farmakoterapii v otolaringologii /Obzor literatury/).** I. S. Chekman (Kievskii Meditsinskii Institut, Kiev, Ukrainian SSR) and R. A. Abyzov (Kievskii Institut Usovershenstvovaniia Vrachei, Kiev, Ukrainian SSR). *Zhurnal Ushnykh, Nosovykh i Gorlovых Boleznei*, May-June 1982, p. 79-82. 25 refs. In Russian.

A82-42629 ↑ **Ear-nose-throat electrodiagnostic device for determining the rheobase of human mucosa and skin (Pribor 'LOR-elektrodiagnostika' dlia opredeleniya reobazy slizistykh obolochek i kozhi cheloveka).** A. G. Zazhivilov (Odesskii Meditsinskii Institut, Odessa, Ukrainian SSR) and M. P. Dubinianskii (Odesskii Elektrotehnicheskii Institut Sviazi, Odessa, Ukrainian SSR). *Zhurnal Ushnykh, Nosovykh i Gorlovых Boleznei*, May-June 1982, p. 77, 78. In Russian.

A82-42630 ↑ **Classification of pathological states of the stato-kinetic /vestibular/ analyzer (O klassifikatsii patologicheskikh sostoianii stato-kineticheskogo /vestibularnogo/ analizatora).** V. S. Olisov (Leningradskii Gosudarstvennyi Sanitarno-Gigienicheskii Meditsinskii Institut, Leningrad, USSR) and V. G. Bazarov (Kievskii Nauchno-Issledovatel'skii Institut Otolaringologii, Kiev, Ukrainian SSR). *Zhurnal Ushnykh, Nosovykh i Gorlovых Boleznei*, May-June 1982, p. 52-58. 37 refs. In Russian.

A82-42631 ↑ **Individual features in the organization of the human endocrin system (Individual'nye osobennosti organizatsii endokrinnoi sistemy cheloveka).** V. S. Gorozhanin (Kustanaiskii Pedagogicheskii Institut, Kustanai, Kazakh SSR). *Problemy Endokrinologii*, vol. 28, July-Aug. 1982, p. 33-39. 32 refs. In Russian.

A study carried out on 26 healthy males ranging in age from 19 to 28 reveals that there are two diametrically opposed variants in the organization of the endocrin system. One is characterized by high activity of the sympathetic adrenal and hypophysial adrenal systems, high activity of the insular apparatus of the pancreas, and a comparatively lower activity of the hypophysial thyroid system and gonads. In the other variant, the activities are reversed. The variants are found to be linked to the organization of the nervous system. The first variant corresponds to a nervous system where hypothalamic, reticular, and amygdala effects prevail over the inhibiting effects of the neopallium, the corpus striatum, septo-hippocampal system, and the epiphysis. In the other variant, the prevalence is reversed. It is believed that individual features of the endocrine system may be responsible for such disorders as hypothalamic obesity, hypertension, acromegaly, and bronchial asthma.

C.R.

A82-42632 ↑ **Features of information processing in the right and left hemispheres of the human brain /A survey of the literature/ (Osobennosti pererabotki informatsii v pravom i levom polushariakh mozga cheloveka /Obozor literatury/).** B. I. Belyi. *Zhurnal Nevropatologii i Psichiatrii im S. S. Korsakova*, vol. 82, no. 7, 1982, p. 1091-1098. 81 refs. In Russian.

A82-42633 ↑ **Morphological criteria for diagnosing pathologies of the thymus with myasthenia (Morfologicheskie kriterii diagnostiki patologii timusa pri miastenii).** V. A. Rykov (Novokuznetskii Institut Usovershenstvovaniia Vrachei, Novokuznetsk, USSR). *Zhurnal Nevropatologii i Psichiatrii im S. S. Korsakova*, vol. 82, no. 7, 1982, p. 1033-1038. 10 refs. In Russian.

A82-42634 ↑ **Functional conditions of the brain and cerebral pathology (Funktional'nye sostoiania mozga i tserebral'naia patologii).** A. M. Vein and N. N. Iakhno (Moskovskii Meditsinskii Institut, Moscow, USSR). *Zhurnal Neuropatologii i Psichiatrii im S. S. Korsakova*, vol. 82, no. 7, 1982, p. 1015-1020. 24 refs. In Russian.

The role of organic and functional factors in the pathogenesis of diseases of the central nervous system is reviewed. Studies of neurological diseases present in various functional conditions of the brain are discussed, and the neurophysiological and neurochemical mechanisms of these conditions are examined. It is concluded that clinical studies of Parkinsonism, epilepsy, and other diseases in patients, both during sleep and while awake, show the importance of such functional investigations of the pathogenesis of neurological diseases of the brain.

N.B.

A82-42635 ↑ **Neurophysiological mechanisms of the compensation of motor disturbances in the presence of lesions of the pyramid system /An electromyographic analysis/ (O nekotorykh neirofiziologicheskikh mekhanizmakh kompensatsii dvigateльnykh narushenii pri porazhenii piramidnoi sistemy /Elektromiograficheskii analiz/).** V. P. Novikova (Akademiiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Zhurnal Nevropatologii i Psichiatrii im S. S. Korsakova*, vol. 82, no. 7, 1982, p. 1010-1014. 17 refs. In Russian.

A82-42636 ↑ **The influence of afferent visual impulses on the morphological and biochemical parameters of the development of the neurons of the visual, motor, and parietal cerebral cortices (O vliianii afferentnykh zritel'nykh impul'sov na morfologicheskie i biokhimicheskie pokazateli razvitiia neironov zritel'noi, dvigateльnoi i temennoi kory mozga).** L. M. Gershstein and L. A. Kukuev (Akademiiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Zhurnal Nevropatologii i Psichiatrii im S. S. Korsakova*, vol. 82, no. 7, 1982, p. 974-980. 19 refs. In Russian.

A82-42637 ↑ **Morphological features of the individual structure of the human brain (Morfologicheskie osobennosti individual'nogo stroenii mozga cheloveka).** I. N. Bogolepova (Akademiiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Zhurnal Nevropatologii i Psichiatrii im S. S. Korsakova*, vol. 82, no. 7, 1982, p. 972-974. 8 refs. In Russian.

The variations in the morphological structure of the human brain were examined in 205 individuals. Results show a great variation in the brain weights of different individuals, particularly for each hemisphere. In addition, an examination of the variations of the rostrocaudal length showed that in a majority of individuals the rostrocaudal length was longer in the left hemisphere than in the right. The logomotor areas 44 and 45 exhibited variabilities in the total volumetric fraction and in the neuronal composition of layers III and V.

N.B.

A82-42638 ↑ **An experimental study of the human blood-cerebral barrier using scanning electron microscopy (Opyt izucheniiia gemitolikvorno-go bar'era cheloveka metodom skaniruushchei elektronnoi mikroskopii).** A. I. Kiktenko (Akademiiia Meditsinskikh Nauk, SSSR, Moscow, USSR). *Zhurnal Nevropatologii i Psichiatrii im S. S. Korsakova*, vol. 82, no. 7, 1982, p. 968-971. 22 refs. In Russian.

The results obtained in examining the epithelium of the choroid plexuses of the lateral ventricles using scanning electron microscopy are described. A superficial morphological picture makes it possible to distinguish four types of cells in the choroid plexus epithelium, namely cells bearing microvilli on the surface presented to the ventricle lumen, cells having a relatively smooth surface, cells bearing scanty cilia, and cells characterized by large processes. The diversity in the morphological picture of the surface of the choroid plexus epithelium cells is seen as a manifestation of the activity of the barrier between the blood and cerebrospinal fluid represented by those cells.

C.R.

A82-42794 # **Aerial combat simulation in the U.S. Air Force.** P. A. Cook (USAF, Human Resources Laboratory, Williams AFB, AZ). *Astronautics and Aeronautics*, vol. 20, Sept. 1982, p. 60-65.

Progress in techniques and equipment for successful computer image generation (CIG) combat simulator trainers for the pilots of A-10 and F-16 fighters are described. An advanced simulator features seven visual display screens on a dodecahedron structure to give 300 deg horizontal and 140 deg vertical field of

view on 36 in. CRTs, all mounted on a six-degree-of-freedom motion platform. Combat simulation training with F-5 pilots yielded improved performances in actual practice combat flights. SAM missile launches and antiaircraft fire can be simulated, along with full combat maneuvering, although representation of enemy planes is still limited to 2-3 km distance at most. Twin cockpits permit joint missions to be flown against a third, visually projected target field. Further advances in helmet-mounted simulations and coupling of actual weapons systems electronics to simulator displays are discussed.

M.S.K.

A82-42829 **Vibration and comfort. I - Translational seat vibration.** M. J. Griffin, E. M. Whitham, and K. C. Parsons (Southampton, University, Southampton, England). *Ergonomics*, vol. 25, July 1982, p. 603-630. 19 refs.

The effects of level, frequency, and duration of the translational vibration of a firm flat seat are investigated as part of a series of studies of discomfort caused by multi-axis vibration at the seat, feet, and back of seated persons. The levels of fore-and-aft, lateral, and vertical seat vibration which causes discomfort equivalent to 0.5 and 1.25 m/sq sec r.m.s. 10 Hz vertical seat vibration are determined at octave center frequencies from 1-63 Hz. In addition, comfort contours equivalent to 0.8 m/sq sec r.m.s. 10 Hz vertical seat vibration and subject transmissibilities are determined at preferred third-octave center frequencies from 1-100 Hz. It is found that the shapes of equivalent comfort contours need not normally depend on vibration level, and significant correlations are found between subject characteristics (size and transmissibility) and subject relative discomfort. A method also is developed to predict the influence of high levels of harmonic distortion on the comfort contours.

N.B.

A82-42830 **Vibration and comfort. II - Rotational seat vibration.** K. C. Parsons and M. J. Griffin (Southampton, University, Southampton, England). *Ergonomics*, vol. 25, July 1982, p. 631-644. 7 refs.

The effects of level, frequency, and direction of the roll, pitch, and yaw vibration of a firm flat seat are studied to investigate the discomfort produced by rotational seat vibration. The levels of roll, pitch, and yaw seat vibration which causes discomfort equivalent to 0.5 and 1.25 m/sq sec r.m.s. 10 Hz vertical seat vibration are determined at octave center frequencies in the range 1-31.5 Hz. In addition, the comfort contours equivalent to 0.8 m/sq sec r.m.s. 10 Hz vertical seat vibration are determined at preferred third-octave center frequencies from 1-31.5 Hz. Results for both individual and group equivalent comfort contours show that the shape of the contours need not normally depend on vibration level. The median contours of vibration acceleration increase in proportion to vibration frequency in all three axes, while sensitivity is greatest for roll vibration and least for yaw vibration of the seat.

N.B.

A82-42831 **Subjective response to whole-body vibration - The effects of posture.** D. J. Oborne and P. A. Boarer (Swansea, University College, Swansea, Wales). *Ergonomics*, vol. 25, July 1982, p. 673-681. 23 refs. Research supported by the Social Science Research Council.

In an investigation of the effects of posture on subjective responses to whole-body vibration, 20 undergraduate subjects produced equal sensation contours adopting three postures each on different occasions. The postures adopted were standing, sitting upright and sitting slouched. The results indicated significant differences in the contour shapes from the three postures, and the level set in the sitting postures were significantly lower than in the standing posture. No difference was obtained between the two sitting postures. Implications of these findings are discussed regarding the role of transmissibility in subjective response to vibration, and the necessity to produce different standards for different postures.

(Author)

A82-42900 **Three stimuli for visual motion perception compared.** H. Wallach, M. L. McMahon (Swarthmore College, Swarthmore, PA), and A. O'Leary (Stanford University, Stanford, CA). *Perception and Psychophysics*, vol. 32, no. 1, July 1982, p. 1-6. 7 refs. Grant No. PHS-11089.

Two arrangements yielding induced motion were used to explore the relative effectiveness of three stimulus conditions known to produce perception of motion - namely, image displacement, ocular pursuit, and object-relative displacement. In these arrangements, object-relative displacement, which resulted in induced motion, was in conflict either with ocular pursuit or with image displacement. The outcomes of these conflicts were determined by measuring the extent of induced motion. Image displacement proved more effective in competing with object-relative displacement than did ocular pursuit, which in one arrangement yielded to object-relative displacement entirely. The same pattern of results was obtained both with the usual arrangement of the moving-center type and with a stationary-center display.

(Author)

A82-42993 **† Methods of human adaptation to heat (O metodike teplovoi adaptatsii cheloveka).** A. T. Mar'janovich. *Voenno-Meditsinskii Zhurnal*, July 1982, p. 41-43. 8 refs. In Russian.

Experiments were conducted to evaluate the discrete or discontinuous method of adaptation to heat, in which a tolerance to heat is built up by short exposures (of the order of 10 minutes) to extremal thermal effects. It is shown that, in certain cases, the discrete method involving the effect of an extremal heat factor is

superior to the method of continuous exposure to a lower-intensity heat factor. The discrete method can be used to speed up the heat-adaptation process.

B.J.

A82-42994 **† Analysis of methods for evaluating thermal stress (Analiz metodov otsenki termostressa).** V. P. Kovalenko and V. V. Pastukhov. *Voenno-Meditsinskii Zhurnal*, July 1982, p. 43, 44. In Russian.

Various methods for evaluating the functional state of the human body under the effects of heat or cold are analyzed with reference to providing suitable uniforms for military personnel. Rectal temperature, the state of the cardiovascular system, external breathing, the state of the central nervous system, the functioning of the motor analyzer, skin sensitivity, and the state of the sympathoadrenocortical system were among the factors evaluated. The condition studied involved extremal temperatures ranging from +45 to -35 C.

B.J.

A82-42995 **† The dynamics of certain psychophysiological indicators under the cumulative effect of Coriolis accelerations (Dinamika nekotorykh psichofiziologicheskikh pokazatelei pri vozdeistvii kumulativsii uskoreniyu Koriolisa).** V. I. Babiiak, L. A. Glaznikov, and V. A. Mozin. *Voenno-Meditsinskii Zhurnal*, July 1982, p. 45-47. 8 refs. In Russian.

Indicators of simple and complex sensorimotor reaction before and after the effect of the continuous accumulation of Coriolis accelerations were studied in subjects with varying degrees of resistance to motion sickness. It is shown that the simple sensorimotor reaction is not an informative indicator in the case of cumulative Coriolis accelerations. The complex sensorimotor reaction more adequately reflects the psychophysiological state of the body in the case of the appearance of the motion-sickness syndrome (even in its latent forms).

B.J.

A82-42996 **† Individual features of the vegetative regulation of body functions during the adaptation of sailors in the tropics (Individual'nye osobennosti vegetativnoi regulatsii funktsii organizma pri adaptatsii moryakov v tropikakh).** V. V. Berdyshev. *Voenno-Meditsinskii Zhurnal*, July 1982, p. 48. In Russian.

A82-42997 **† Microcirculation during acute blood loss and hypoxia (Mikrotsirkulatsiya pri ostroii krovopotere v usloviyah gipoksi).** L. A. Tarent'ev. *Voenno-Meditsinskii Zhurnal*, July 1982, p. 49, 50. In Russian.

The microcirculation state (as reflected in arterial-pressure indices and EKG data) in dogs was studied under conditions of the separate and combined effects of acute blood loss and hypoxia. Blood circulation was found to be considerably disrupted in animals not adapted to oxygen deficit in inhaled air under the combined effect of hypoxic and hemic hypoxia. The preliminary adaptation of the dogs to hypoxia was shown to increase their resistance to blood loss.

B.J.

A82-43045 **Effect of dosed physical loading on plasma and liver lipids and lipoproteins in rats.** L. N. Dakovska and V. T. Orbetsova (Meditinskaya Akademiya, Sofia, Bulgaria). *Bolgarskaia Akademiia Nauk, Doklady*, vol. 35, no. 4, 1982, p. 549-552. 11 refs.

The quantity of total lipids (TL), phospholipids (PhL), and free fatty acid (FFA) are investigated using Boehringer test reagents in adequate aliquots of blood plasma or purified Folch extracts (evaporated to dryness at 60 C). The lipoproteins (LP) are separated in two ways. For qualitative purposes, electrophoretic techniques (discacylamide electrophoresis) are used; for a quantitative determination of cholesterol (Ch) and triglycerides (TGl) in the LP, Wilson's dual-precipitation method is used. It is found that the quantity of total lipids and total Ch in the experimental group does not differ from that of the controls. The content of PhL shows an upward tendency and that of TGl is significantly higher.

C.R.

A82-43046 **Effect of dosed physical loading on biological oxidation and bioenergy in liver and myocardium.** V. T. Orbetsova, L. N. Dakovska, M. P. Anastasova, N. N. Iavorska, and M. T. Pesheva (Meditinskaya Akademiya, Sofia, Bulgaria). *Bolgarskaia Akademiia Nauk, Doklady*, vol. 35, no. 4, 1982, p. 553-556. 7 refs.

Experiments with two plasticizers (Santisizer and Condea) are carried out on seven groups of 10 male rats whose body weights range from 200-240 g. The plasticizers are applied dermally using Draize's method: 21 daily applications five times a week in doses of 4, 1, and 0.5 ml/kg. During the 21-day period, no changes are observed in the behavior, general condition, food consumption, and body weight of the animals. The activity of oxidizing enzymes and phosphatases in the myocardium is determined. It is found that in low doses the phthalate plasticizers do not substantially change all the enzyme activities tested in myocardium homogenates.

C.R.

A82-43099 **Contrast increment thresholds of rhesus monkeys.** E. L. Smith, III, R. S. Harweth, D. M. Levi, and R. L. Boltz (Houston, University, Houston, TX). *Vision Research*, vol. 22, no. 9, 1982, p. 1153-1161. 30 refs. Grants No. NIH-EY-03611; No. NIH-EY-01139; No. NIH-EY-01728.

Increment contrast thresholds were determined behaviorally as a function of background contrast for sinusoidal gratings with spatial frequencies between 0.5

and 8.0 c/deg. As has been previously reported for humans, the contrast discrimination functions were characterized by a facilitation effect for low background contrasts and a masking effect for high background contrasts. The shapes of the functions varied with spatial frequency, but for all spatial frequencies, portions of the functions were adequately described by a power law. The shapes of the reaction time distributions obtained for near threshold stimuli suggested that at least two mechanisms with different spatio-temporal sensitivities were involved in detecting the stimulus and that the exact shape of the contrast discrimination function was dependent on which mechanism dominated detection. (Author)

A82-43100 Hyperacuity and interpolation by the visual pathways. A. W. Snyder (Australian National University, Canberra, Australia). *Vision Research*, vol. 22, no. 9, 1982, p. 1219, 1220. 12 refs.

Hyperacuity demands some form of neural interpolation. This places constraints on the relation between optical image quality and the cone mosaic. In particular, if the cone mosaic significantly undersamples the optical image, then hyperacuity is downgraded. This fact is consistent with the comparatively poor hyperacuity in the peripheral retina of man. (Author)

A82-43145 Computer simulation of respiratory control system. N. Suzuki and A. Uchiyama (Waseda University, Tokyo, Japan). *Electronics and Communications in Japan*, vol. 63, Nov. 1980, p. 118-126. 8 refs. Translation.

A computer simulation of the human respiratory control system is carried out using a model which incorporates the diffusion phenomenon and gas transport delay. The response of the respiratory system to carbon dioxide inhalation, a lack of oxygen in the inhaled air, and possible damage within the system is investigated within the framework of the proposed model. Finally, several methods for refining the model are suggested. V.L.

A82-43221 Interpretation of Viking biology experiments (K voprosu ob interpretatsii biologicheskikh eksperimentov na KA 'Viking'). A. V. Garbul, L. M. Mukhin, S. L. Orlov, and A. I. Shafiev. *Kosmicheskie issledovaniia*, vol. 20, July-Aug. 1982, p. 651-653. 9 refs. In Russian.

An experiment has been carried out in which soil samples imitating Martian soil were irradiated with high-energy electrons and gamma quanta. Results suggest that radiation defects accumulating in Martian soil due to the effect of cosmic rays may be one of the sources of the gases that were detected by the Viking spacecraft in the Martian atmosphere. V.L.

A82-43222 Comparative analysis of the biological effects of electromagnetic radiation. II - Eye damage. Cataractogenesis (Sravnitel'nyi analiz biologicheskikh effektov elektromagnitnykh izluchenii. II - Porazhenie glaz. Kataraktogenetika). B. I. Davydov, V. S. Tikhonchuk, and V. V. Antonov. *Kosmicheskie issledovaniia*, vol. 20, July-Aug. 1982, p. 653-655. 20 refs. In Russian.

The available literature on cataracts induced by microwave radiation in animals and humans is briefly reviewed. It is found that microwave radiation produces cataracts in animals at frequencies of 2450-3000 and 10,000 MHz; cataractogenesis is not observed at lower frequencies. Equations are presented for extrapolating thresholds for reversible eye changes and for cataractogenesis in humans subjected to microwave radiation. The threshold of functional and organic changes of the human eye is a function of absorbed dose and dose power. B.J.

A82-43230 Threshold models of spatial vision (Porogovye modeli prostranstvennogo zreniya). V. D. Glezer (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Fiziologija Cheloveka*, vol. 8, July-Aug. 1982, p. 547-558. 43 refs. In Russian.

A comparative analysis is presented of neurophysiological studies of receptive fields and psychophysiological data concerning the detection and recognition of simple images, and the discrimination of textures. A threshold detection model is described which is based on a set of independent elements whose weighting function is the difference of two Gaussians; the elements are combined by spatial-probabilistic summation. A threshold recognition model is proposed which is based on a set of detector gratings of different frequencies. The texture discrimination model consists of nonlinear incoherent spatial-frequency filters. The neurophysiological correlates of each of these three types of spatial elements are discussed. B.J.

A82-43231 Dynamics of the process of the determination of orientation by man (Dinamika protsesssa otsenki orientatsii chelovekom). N. B. Kostelianets and V. M. Kamenkovich (Akademiia Nauk SSSR, Institut Vysshii Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR). *Fiziologija Cheloveka*, vol. 8, July-Aug. 1982, p. 559-563. 14 refs. In Russian.

The accuracy of human visual determination of the orientation of a line was evaluated as a function of the time set aside for this task. This time was limited either by masking with one image or by the additional task of recognizing one of three possible masking images. In the first case, a monotonic dependence of the precision of orientation determination on the time interval between the test and masking images was found. The second case showed a nonmonotonic depen-

dence. Possible neurophysiological mechanisms for this difference are discussed. B.J.

A82-43232 Factors determining the characteristics of the perception of stabilized retinal images (O faktorakh, opredeliaushchikh osobennosti vospriyatiia stabilizirovannykh setchatochnykh izobrazhenii). G. I. Rozhkova, P. P. Nikolaev, and V. E. Shchadrin (Akademiia Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR). *Fiziologija Cheloveka*, vol. 8, July-Aug. 1982, p. 564-571. 21 refs. In Russian.

It is shown that given the same precision of stabilization of retinal images but different conditions and parameters of stimulation it is possible to observe either irreversible fading of visual images or their prolonged existence. The observed images differ significantly in their temporal evolution: they can disappear after a few seconds or last for many minutes, smoothly fade and fluctuate or maintain their sharpness for a long time and gradually fade. Anatomical, physiological, and psychological factors are examined which might explain these features of the perception of stabilized images. It is suggested that the formation of images in conditions of stabilization might be facilitated by the high contrast and large size of the test field, the high contrast of test objects, and the presentation of matched stimuli to both eyes (i.e., the simulation of binocular vision). B.J.

A82-43233 Mechanisms of the damaging effect of light on retinal photoreceptors (Mekhanizmy povrezhdaushchego deistviia sveta na fotoreseptory setchati glaza). M. A. Ostrovskii and I. B. Fedorovich (Akademiia Nauk SSSR, Institut Khimicheskoi Fiziki, Moscow, USSR). *Fiziologija Cheloveka*, vol. 8, July-Aug. 1982, p. 572-577. 16 refs. In Russian.

Data on light-produced damage in the human retina are examined. It is shown that prolonged exposure to bright light mainly imperils those who are prone to eye diseases, and that the light effect consists in damage to photoreceptors, which destroys their contacts with pigment epithelium. The mechanism for this damaging effect of light is shown to be the oxidation of rhodopsin and lipids (the molecular components of the photoreceptor membrane) which is photoinduced by the end products of photolysis of the retinal pigment. Ways to protect the eyes from this type of damage are discussed. B.J.

A82-43234 Brain-stem auditory evoked potentials in persons with normal hearing (Korotkolatentnye slukhovye vyzvannye potentsialy u ludei s normal'nym slukhom). B. M. Sagalovich and G. G. Melkumova (Ministerstvo Zdravookhraneniia RSFSR, Moskovskii Nauchno-Issledovatel'skii Institut Ukh, Gorla i Nosa, Moscow, USSR). *Fiziologija Cheloveka*, vol. 8, July-Aug. 1982, p. 578-584. 25 refs. In Russian.

Brain-stem auditory evoked potentials were recorded in 40 persons (with ages ranging from 18 to 25) with normal hearing. It is shown that the latent periods of the principal waves of the potentials are characterized by low intrasubject and intersubject variability, whereas their amplitudes are extremely unstable. These potentials are masked by white noise, the character of the masking being determined by the relationship between the suprathreshold intensity of the masker and the masked auditory click. It is concluded that both fast and slow auditory evoked potentials should be recorded in order to obtain complete information about the objective condition of hearing. B.J.

A82-43235 Psychophysical characteristics of perception and bioelectric activity of the brain during micropolarization of the occipital part of the hemispheres (Psichofizicheskie kharakteristiki vospriyatiia i bioelektricheskai aktivnost' mozga pri mikropoligrizatsii zatyochnoi oblasti polusharii). I. A. Korsakov and L. V. Matveeva (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Obshchei i Sudebnoi Psichiatrii, Moscow, USSR). *Fiziologija Cheloveka*, vol. 8, July-Aug. 1982, p. 595-603. 10 refs. In Russian.

A82-43236 Electrocardiographic correlates of emotional stress (K voprosu ob elektrokardiograficheskikh korrelatakh emotsional'nogo napriazhenii). E. I. Sokolov and E. V. Belova (Meditinskii Stomatologicheskii Institut, Moscow, USSR). *Fiziologija Cheloveka*, vol. 8, July-Aug. 1982, p. 609-614. 15 refs. In Russian.

EKG studies were performed on 33 healthy human subjects (with ages ranging from 17 to 23) who were subjected to emotional stress. It is shown that the main changes produced by emotional stress are in the P and T waves. These changes have different signs and depend on the type of vegetative regulation. Changes in the shape and amplitude of the P wave are found to be an index of emotional stress. B.J.

A82-43237 Physiological mechanisms determining the mechanical work of breathing for different types of muscular activity (Fiziologicheskie mehanizmy, opredeliaushchie rabotu dykhaniia pri razlichnykh vidakh myshechnoi deiatel'nosti). V. V. Gritsenko, V. I. Gavril'ev, and O. Iu. Mochalov (Leningradskii Meditsinskii Institut, Leningrad, USSR). *Fiziologija Cheloveka*, vol. 8, July-Aug. 1982, p. 615-621. 20 refs. In Russian.

Experiments were performed on healthy young human subjects under conditions of rest, voluntary hyperventilation, and physical exercise (ergometer loads of 10 to 125 W on the upper and lower extremities). An analysis of respiratory

A82-43238

and cardiovascular indicators showed that the main factors determining the mechanical work of breathing during muscular activity are the intensity of ventilation, the blood level in lung vessels, and the breathing volume. The influence of these factors is more pronounced during manual exercise and in women. B.J.

A82-43238 ↑ **The effect of body position and the administration of a diuretic on the water-salt status and the activity of the kidneys (Vliyanie položenija tela i priema diuretika na vodno-solevoi status i deiatel'nost' pochek).** V. B. Noskov. *Fiziologija Cheloveka*, vol. 8, July-Aug. 1982, p. 638-641. 12 refs. In Russian.

Experiments were performed on 10 healthy males in order to evaluate the effect of orthostatic and antiorthostatic (-20 deg) body positions and the administration of a diuretic on the indicators of the natriuretic function of the kidneys and the water-electrolyte status. The antiorthostatic position and the peroral administration of the diuretic are found to produce regular changes in the water-salt homeostasis and in the activity of the kidneys; these changes are determined by a decrease in the reabsorption of fluid and salts. The combined action of the antiorthostatic position and the diuretic is found to constitute a synergistic effect. B.J.

A82-43239 ↑ **The relationship between postural components and voluntary movement (Sviaz' pozykh komponentov s proizvol'nym dvizheniem).** N. V. Kholmogorova (Moskovskii Gosudarstvennyi Pedagogicheskii institut, Moscow, USSR). *Fiziologija Cheloveka*, vol. 8, July-Aug. 1982, p. 642-652. 22 refs. In Russian.

Experiments performed on 30 healthy human subjects showed that changes in muscular postural activity precede voluntary movement if the latter produces a change in the center of gravity of the body. This postural anticipation of movement was disclosed in the case of the lifting of the arms as well as in the case of stabilization of the body with a horizontally outstretched arm. Local arm movement was preceded by a preparatory period of postural reactions, including two components: the inhibition of the background activity of a series of muscles and the anticipatory activity of leg muscles. B.J.

A82-43240 ↑ **Evaluation of the heaviness of physical work with marked nervous-emotional stress (Otsenka tiazhesti truda pri fizicheskoi rabote s vyrazhennym nervno-emotsional'nym napriazheniem).** D. M. Demina, M. N. Evlampieva, A. B. Kirpichnikov, and E. M. Ratner (Ministerstvo Putey Soobshcheniya SSSR, Vsesoiuznyi Nauchno-Issledovatel'skii Institut Zheleznodorozhnoi Gigieny, Moscow, USSR). *Fiziologija Cheloveka*, vol. 8, July-Aug. 1982, p. 660-664. 8 refs. In Russian.

A82-43329 # **The role of the test pilot in flight tests (Die Rolle des Testpiloten bei der Flugerprobung).** D. Thomas (Dornier GmbH, Friedrichshafen, West Germany). *Deutsche Gesellschaft für Luft- und Raumfahrt, Symposium über angewandte Flugwissenschaften bei der Entwicklung des Alpha Jet, Darmstadt, West Germany, Sept. 24, 1981, Paper. 19 p. In German.*

A description is presented of various aspects related to the development of an aircraft, taking into account the experience of the project pilot in connection with the development of the Alpha Jet aircraft. The Alpha Jet was developed as a training aircraft and bomber aircraft in a joint project by French and German aerospace companies. Attention is given to the objectives of flight tests, the functions of the test pilot in connection with the development of the aircraft, details concerning the daily activities of a test pilot, the determination of flight performance, comments concerning the duration and extension of the flight tests, weapons tests, and approaches for avoiding aircraft accidents due to poststall gyration. G.R.

A82-43383 **Regulation of circadian rhythmicity.** J. S. Takahashi (National Institutes of Health, Laboratory of Clinical Science; National Institute of General Medical Sciences, Bethesda, MD) and M. Zatz (National Institutes of Health, Laboratory of Clinical Sciences, Bethesda, MD). *Science*, vol. 217, Sept. 17, 1982, p. 1104-1111. 106 refs.

An anatomical and physiological basis for circadian rhythmicity in animals is presented. A suprachiasmatic nucleus which displays all basic characteristics of circadian rhythms and multiple oscillators comprise the anatomical basis of the system. Neural activity in the nucleus persists at least 34 cycles after surgical isolation, and evidence suggests that the nucleus acts as a pacemaker within the mammalian system. The pacemaking system normally functions as a single oscillator, but evidence shows the possibility of a multisensor system. Two organizational types may be the basis for this system: a dominant pacemaker imposes itself on the system, or a mutually coupled system shares the role. The biochemical analysis reveals two regulators of the system: the pineal gland which expresses a driven rhythm, and the Aplysia eye whose phase-shifting effects are mediated by the synthesis of adenosine 3',5'-monophosphate. Potentially useful experimental systems to study the oscillator biochemical components of multicellular organisms have emerged. R.K.R.

A82-43388 **Use of physiological information in man-machine systems.** A. A. Desova. *Avtomatika i Telemekhanika*, Jan. 1982, p. 151-166.

Automation and Remote Control, vol. 43, no. 1, June 20, 1982, pt. 2, p. 122-135. 124 refs. Translation.

Attention is given to the use of physiological information on the condition and characteristics of the human operator in designing, studying, and operating man-machine systems. Groups of specialized engineering psychological criteria are developed that characterize practical problems. The main steps of a methodological approach for obtaining formalized estimates of physiological information are formulated and described. An approach to obtaining a quantitative estimate of the human operator's functional state is suggested and then developed in an example of scale formulation for operating tension. C.R.

A82-43513 ↑ **Internal stresses and contractility of myocardium (Vnitrennye napriazheniya i sokratitel'naya sposobnost' miokarda).** G. S. Pisarenko, V. V. Kriveniuk, A. A. Moibenko, T. P. Sivachenko, and A. K. Belous (Akademija Nauk Ukrainskoj SSR, Institut Problem Prochnosti, Kiev, Ukrainian SSR). *Mekhanika Kompozitnykh Materialov*, July-Aug. 1982, p. 690-694. 6 refs. In Russian.

Model computations of stresses in the left ventricle due to external load and systolic contraction of the myocardial elastic component are presented. Analysis of the data obtained, taken in conjunction with the results of certain physiological experiments reported in the literature, shows that the final systolic volume is an important indicator of the contractile function of myocardium. V.L.

A82-43602 ↑ **Mental hygiene of sailors (Psichogigiena moriaka).** Iu. M. Sten'ko. Leningrad, Izdatel'stvo Meditsina, 1981. 176 p. 194 refs. In Russian.

The social-psychological and physiological factors involved in the adaptation of sailors to the conditions of sailing, the lowering of the incidence of illness on cruises, and increasing the social activity and efficiency of sailors are examined. The peculiarities of the working and climatic conditions on ships at sea are discussed, and concrete recommendations are provided for the organization of work during prolonged cruises at various latitudes, prophylactic hypodynamics, the formation of stable working groups on ships, and the organization of rest and relaxation on board ships as well as in ports. Attention is concentrated on the psychological climate and the interrelations of the group. N.B.

A82-43607 ↑ **Sleep and motor activity: Stages of the ontogenetic evolution of the supraspinal motor control in the human sleep cycle (Son i dvigatel'naya aktivnost': Etapy ontogeneticheskoi evolutsii supraspinal'nogo motornogo kontrolya v tsikle sna u cheloveka).** I. A. Vakhrameeva. Leningrad, Izdatel'stvo Nauka, 1980. 152 p. 258 refs. In Russian.

A82-43610 ↑ **Thermogenesis and muscle activity during the adaptation to cold (Termogenez i myshechnaya deiatel'nost' pri adaptatsii k kholodu).** Iu. I. Bazhenov. Leningrad, Izdatel'stvo Nauka, 1981. 105 p. 392 refs. In Russian.

The role of muscle activity in the process of the adaptation of homeothermic animals to cold is reviewed. The changes in the energetics of the various forms of muscular activity during individual and specific acclimations to low environmental temperatures are analyzed. The role of muscle activity in the development of the adaptive changes of thermogenesis is discussed in detail. In addition, the basic principles of the compensatory interaction between the specific thermoregulatory and motor functions of the muscles during the division and combination of the influence of cold and muscle activity on an organism are presented. N.B.

A82-43611 ↑ **The morphology of the connections of the cortical vestibular zone (Morfologiia sviazei korkovoi vestibularnoi zony).** A. S. Iontov, V. A. Kisliakov, T. F. Kuleshova, F. N. Makarov, and V. A. Otelin. Leningrad, Izdatel'stvo Nauka, 1980. 128 p. 365 refs. In Russian.

The physiology of the cortical connections of the vestibular apparatus in several animals is reviewed. Also discussed is the input-output switching of the vestibular impulses which enter the cerebral cortex. Recent morphological data about the associative and commissural connections with the vestibular nuclei of the medulla oblongata and with the formations of the striopallidal complex are examined. In addition, results of electron microscopic investigations concerning the reactivity of the vestibular cortex to the action of gravitational overloads are presented. N.B.

A82-43627 ↑ **The intracentral connections of the brain structures participating in cardiovascular control (O vnutrinsentral'nykh sviaziakh mozgovykh struktur, uchastvuyushchikh v regulatsii krovoobrashchenija).** M. I. Gurevich, A. G. Kartseva, and V. A. Maiskii (Akademija Nauk Ukrainskoj SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Aug. 1982, p. 1025-1031. 11 refs. In Russian.

The hemodynamic responses to the electrical stimulation of different hypothalamus structures, and to simultaneous electrical stimulations of the sinus nerve and the hypothalamus are studied in anesthetized vagotomized cats. In addition, the monosynaptic hypothalamic connections to the brain and spinal cord are investigated. Results show that the hypothalamus influences the efferent link

in the regulation of cardiovascular control by means of the activation of various descending pathways both through the bulbar level of regulation as well as by omitting it. A scheme of the intracentral monosynaptic connections which participate in cardiovascular control is given.

N.B.

A82-43628 † **The role of the integrity of the central synaptic and direct influences in the regulation of hemodynamics (O roli integrativnosti tsentral'nykh sinapticheskikh i priamykh vliiani v regulatsii hemodinamiki).** K. V. Kovanov (Gosudarstvennyi Meditsinskii Institut, Ternopol, Ukrainian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Aug. 1982, p. 1049-1056. 18 refs. In Russian.

The interrelationships of the direct and reflex mechanisms, as well as the general organization of the regulation of hemodynamics are investigated in cats and dogs. Results show that the ultimate efferent effects of the central apparatus of hemodynamic regulation result from the integrity of their responses to the sum total of the incoming afferent signals and to the substances in the blood and in the cerebrospinal fluid which act directly on these signals. The types of cyto-architectonic constructions and morphological structures which could mediate the central effects of these substances and the interrelationships between the reflex and direct mechanisms of regulation are determined by light and electron microscopic studies of the stereohistological organization of the spinal cord. In addition, a scheme for the organization of the central mechanisms of the regulation of hemodynamics and of the reflex arc structure is presented.

N.B.

A82-43629 † **An analysis of the role of endogenous opioid peptides in experimental hypertension (Analiz roli endogennykh opioidnykh peptidov pri eksperimental'noi gipertenzii).** A. V. Val'dman, O. S. Medvedev, and N. I. Rozhanskaia (Akademiiia Meditsinskikh Nauk, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Aug. 1982, p. 1091-1095. 18 refs. In Russian.

The effects of endogenous opioid peptides on the parameters of the hemodynamic system and on the functions of the baroreceptor reflex are investigated in normotensive rats and in rats with two types of experimental hypertension. In spontaneously hypertensive rats and in rats with one-kidney Goldblatt hypertension, naloxone (0.1 and 1.0 mg/kg body weight) evokes a 10 mm Hg increase in blood pressure, but does not change the sensitivity of the baroreceptor reflex. However, naloxone facilitates this reflex in normotensive rats. A possible role of endogenous peptides in the regulation of blood pressure is proposed in relation to their ability to stimulate mu and delta opiate receptors in the brain.

N.B.

A82-43630 † **The mechanisms of hypertensive responses during emotional stress (Mekhanizmy vozniknoveniya gipertenzivnykh reaktsii pri emotsional'nom napriazhenii).** V. A. Tsyrulin (Nauchno-Issledovatel'skii Institut Kardiologii, Leningrad, USSR) and B. G. Bershadskii (I Meditsinskii Institut, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Aug. 1982, p. 1096-1101. 10 refs. In Russian.

The shifts of the hemodynamic system are studied in alert cats exposed to emotional stress that was evoked by electrical stimulation of the hypothalamus or by confining the cats in a closed chamber in which a dog was also present. Results showed that hypertension, expressed in response to a confrontation with a dog, was accompanied by a suppression of the baroreceptor reflexes in the majority of cats tested. After severing the sino-carotid and aortic nerves, no hypertensive response was observed in these same cats. In two cats, the baroreceptor reflexes were not altered by emotional stress, and deafferentation of the sino-carotid nerve and the arch of the aorta intensified the hypertensive response expressed by the cats during confrontations with dogs. Various mechanisms for the hypertensive response to emotional stress are proposed for various animals.

N.B.

A82-43631 † **The mechanisms of the development of the cardiogenic vagosympathetic reflexes (O mekhanizmakh razvitiia kardiogennykh vago-sympaticheskikh refleksov).** A. A. Moibenko, V. B. Pavliuchenko, I. E. Burikov, and V. M. Shaban (Akademiiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Aug. 1982, p. 1103-1110. 27 refs. In Russian.

The mechanisms of the development of the vagosympathetic depressor reflexes during adrenergic stimulation of the heart and during local immune and ischemic damages of the left ventricle are studied in anesthetized dogs and cats by recording the afferent and efferent impulses from the cardiac nerves as well as the cardiodynamic indices. Reciprocal changes are found in the impulse activity of the cardiac nerves. The frequency of the afferent impulses in the vagal nerves increases, while the efferent impulses in the sympathetic nerves are inhibited. It is proposed that the reflex inhibition of sympathetic impulses and of the depressor reflex is triggered by the stimulation of heart mechanoreceptors that is evoked by the increase in myocardial contractility and the asynergy of the left ventricle.

N.B.

A82-43632 † **Functional means for the regulation of heart rhythm during burst stimulation of the vagus nerves (Funktional'nye vozmozhnosti upravleniya ritmom serdtsa pri zalpovom razdruzhenii bluzhdaiushchikh nervov).** V. M. Pokrovskii, lu. R. Sheik-Zade, V. M. Kruchinin, A. N. Chuganova,

M. V. Pokrovskii, and V. G. Abushkevich (Kubanskii Meditsinskii Institut, Krasnodar, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Aug. 1982, p. 1112-1115. 14 refs. In Russian.

A82-43633 † **The participation of the hypothalamus in the regulation of parasympathetic cardiac reflexes in unanesthetized cats (Uchastie gipotalamusa v regulatsii parasympaticheskikh refleksov na serdtse u neanarkotizirovannykh koshek).** G. E. Samonina, E. I. Pevtsova, and M. G. Udel'nov (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Aug. 1982, p. 1116-1122. 16 refs. In Russian.

A82-43634 † **The responses of the coronary vessels in dogs to hypothalamic stimulation in acute and chronic experiments (Reaktsii koronarnykh sosofov u sobak pri razdruzhenii gipotalamusa v ostrom i khronicheskom opytakh).** A. V. Trubetskoi and V. L. Golubykh (Akademiiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Aug. 1982, p. 1123-1129. 15 refs. In Russian.

A82-43635 † **Conjugated changes of the resistance and blood filling of cerebral vessels during shifts in the blood gas composition (Sopriazhennye izmeneniia soprotivleniya i krovopoplenniya sosofov golovnogo mozga pri svyigakh gazovogo sostava krovi).** V. G. Krasil'nikov and A. I. Artem'eva (Akademiiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Aug. 1982, p. 1130-1136. 12 refs. In Russian.

The changes in the resistance and blood filling of cerebral vessels during various concentrations of CO₂ and O₂ in the blood are studied in anesthetized cats during perfusion of the brain with constant blood volumes. Results show that hypercapnia and hypoxia lead to a decrease in the resistance of the cerebral vessels and to a reduction of the brain blood flow, whereas a decrease in the pCO₂ and an increase in the pO₂ in the blood exerts an opposite effect. The different responses of the vessels are found to have several similar features in respect to the threshold changes of the pCO₂ and pO₂, to the potentiation of the effects of both parts of the vascular system of the brain during increased shifts of the blood gas tension, to the greater sensitivity of both parts of the vascular system to changes in pCO₂ than in pO₂, and to the effect of the blood gas tension on the response of both parts of the vascular system to injections of noradrenaline. It is suggested that an alteration in the filtering and absorption relationships in the brain is caused by the different responses of the arterial and venous vessels to changes in the blood gas tension.

N.B.

A82-43636 † **The interrelationship between the pressor response and energy metabolism during isometric muscle contractions (O sviazi pressornoi reaktsii s energeticheskim metabolizmom myshts, sokrashchayushchikhsya v staticeskom rezhime).** A. V. Vitol's, I. P. Kukulis, A. O. Paeglis, and Ia. V. Skards (Latviiskii Nauchno-Issledovatel'skii Institut, Riga, Latvian SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Aug. 1982, p. 1137-1142. 17 refs. In Russian.

Studies of the pressor response parameters connected with blood flow, energy demands, and maximal isometric work show that the part of the arterial pressure maintained by means of arterial occlusion is dependent upon the energy demands during isometric muscle contractions in humans. It is concluded that a biochemical agent or agents is involved in the formation of the pressor response.

N.B.

A82-43637 † **A composite assessment of heart rhythm regulation during dosed functional loads (Kompleksnaya otsenka regulatsii ritma serdtsa pri dozirovannykh funktsional'nykh nagruzkakh).** N. I. Sapova. *Fiziologicheskii Zhurnal SSSR*, vol. 68, Aug. 1982, p. 1159-1164. 16 refs. In Russian.

The regulation of heart rhythm is studied in 152 healthy trained and untrained men during the performance of physical and mental work. Results show that the regulation of heart rhythm during these functional loads is determined both by the initial balance of the sympathetic and parasympathetic effects, and by its variation during the performance of the work. The expression of the sympathetic effects depends on the peculiarities of regulation and on the flow of afferent impulses which enter the central nervous system during the performance of functional tests of various types, efforts, and lengths. A set of indicators for the evaluation of heart rhythm regulation during these tests is proposed.

N.B.

A82-43638 † **Liver microcirculation in normoxia and hypoxia (Mikrosirkulatsiya v pecheni pri normo- i gipoksemii).** K. P. Ivanov, M. K. Kalinina, Iu. I. Levkovich, N. A. Mal'tsev, and G. P. Mikhailova (Akademiiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, Aug. 1982, p. 1165-1170. 15 refs. In Russian.

The values of the blood flow velocity in the liver sinusoids, and the normal fluctuations of these values and the fluctuations during hypoxic conditions were studied in rat liver sinusoids 11 + or - 1 microns in diameter using the movement of the white blood cells that were flowing in the direction of the red cells as the markers to measure the linear flow velocity. Results showed that the linear flow velocity in normoxic rats was 0.29 + or - 0.01 mm/s and the volumetric flow rate

was calculated to be .00165 microliter/min. During hypoxic conditions the blood pressure dropped to 70-80 torr, and the pO₂ in the arterial blood and in the portal vein dropped to 45 + or - 3 torr and 18 + or - 3 torr, respectively, as compared with 77 + or - 3 torr and 41 + or - 2 torr during normoxic conditions. The mean sinusoidal blood flow velocity increased by nearly 12%. It was concluded that increased oxygen extraction is the main compensatory mechanism in liver tissue hypoxia. N.B.

A82-43651 † **The role of the extrapolation and dynamic stereotype in the mechanism of the formation and improvement of adequate motor coordination (Rol' ekstrapolatsii i dinamicheskogo stereotipa v mekhanizmakh formirovaniia i sovershenstvovaniia adekvatnykh dvigatelejnykh koordinatsii).** N. V. Zimkin (Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, July 1982, p. 926-935. 29 refs. In Russian.

An investigation of the tonus, viscosity, bioelectric potentials, force, and endurance of human muscles shows that all of these properties are greatly altered by fluctuations of muscle temperature and oxygen provision, and also by the processes of dynamic work or static efforts at 25, 50, and 75% of maximal strength. It is found that these results are not in accordance with the theory of the mechanism of the dynamic stereotype. The inner structure of the motor apparatus is permanently altered not only during work, but also during the restitution period. Due to its plasticity, the nervous system has a high capacity for extrapolation and can adequately react to new tasks which arise with changes in the internal or external environment. Extrapolation is improved by training, but decreases after the cessation of training. N.B.

A82-43652 † **The adaptive control of vegetative processes (Adaptivnoe upravlenie vegetativnymi protsessami).** N. N. Vasilevskii and Z. A. Aleksanian (Akademiiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, July 1982, p. 948-952. 17 refs. In Russian.

Clinical investigations of the control of the cardiovascular system by using biofeedback methods are presented. Results showed that rabbits and cats were able to shift their blood pressure level and to alter their heart rate, while humans were found to be able to regulate their heart rhythm using similar methods. In addition, it was found that these methods can modulate the endogenous biorhythm in a range of 15-20 s, and this regulation can be controlled not only in the central nervous system (hypothalamus), but also during the registration of peripheral function of the cardiovascular system (the blood pressure system, heart rhythm). It is concluded that these results indicate the existence of a general mechanism of adaptation to innovation (adaptive rhythm). N.B.

A82-43653 † **The effect of drugs altering the exchange of cAMP on the bioelectrogenesis of skeletal muscles (Vliyanie preparatov, izmeniaushchikh obmen tsAMF, na bioelektrogenez skeletnykh myshts).** I. A. Partrin, A. S. Mozhukhin, and V. O. Samoilov (Gosudarstvennyi Institut Fizicheskoi Kul'tury; Voenno-Meditsinskaya Akademiiia, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, July 1982, p. 970-975. 22 refs. In Russian.

In isolated sartorius muscles from frogs, the bioelectrical characteristics of separate fibers of different groups (dark, light, and intermediate) were studied using microelectrodes in conjunction with in vivo television microscopy in order to determine the effect of drugs which alter cAMP exchange (adrenaline, caffeine, and imidasol) on the resting and action potentials of these muscles. Results showed that 0.00001 M concentrations of these drugs affect the generation potentials in the different fibers to varying degrees, and that the effect of these drugs is more pronounced in the case of excitatory potentials. In addition, a mechanism to account for the effects of these drugs on the bioelectric generation in skeletal muscles is presented. N.B.

A82-43654 † **The effect of a physiological load on the exchange and phosphorylation of cell membrane proteins in the brain of rats (Vliyanie fiziologicheskoi nagruzki na obmen i fosforilirovaniye belkov kletochnykh membran mozga krysy).** V. N. Vitvitskii and L. V. Vitvitskaia (Akademiiia Nauk SSSR, Institut Obshchei Genetiki, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, July 1982, p. 992-998. 14 refs. In Russian.

A82-43655 † **Changes of the functional condition of the neocortex during direct application of optical radiation (Izmenenie funktsional'nogo sostoianiia neokorteksa pri priamom deistvii opticheskogo izlucheniia).** V. A. Velling, G. V. Gal'dinov, and S. A. Gromova (Akademiiia Meditsinskikh Nauk SSSR, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 68, July 1982, p. 999-1006. 20 refs. In Russian.

The action of optical radiation on the bioelectrical activity of the neocortex and the penicillin-induced epileptogenic focus is investigated in rabbits and cats. Results show that the direct action of ultraviolet radiation at wavelengths of 280, 310, and 365 nm leads to an increase in the amplitude of the EEG and intensifies the epileptiform activity, while the action of radiation above the threshold value at wavelengths of 580 and 630 nm evokes a decrease in the EEG amplitude and a suppression of the epileptiform activity. It is proposed that the mechanism of action of ultraviolet radiation on the bioelectric activity of the neocortex is based on changes in the permeability of neural membranes for sodium and potassium

ions and on the subsequent depolarization of the membranes. The action of visible radiation appears to lead to the injuring of the neurons by heat in the irradiated zones, which results in an irreversible suppression of their activity and a reduction of the EEG amplitude. N.B.

A82-43665 † **The mechanism of the activating effect of anti-cardiac antibodies on the electrical and contractile activity of myocardial cells (O mekhanizme aktiviruiushchego deistvija protivoserdechnykh antitel na elektricheskui i sokratitel'nuiu aktivnost' miokardial'nykh kletok).** N. V. Il'chevich and R. I. Ianchii (Akademiiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologicheskii Zhurnal* (Kiev), vol. 28, July-Aug. 1982, p. 401-409. 24 refs. In Russian.

A82-43666 † **Heart antigens (Antigeny serdtsa).** G. M. Butenko, A. A. Moibenko, and O. V. Shablovskaiia (Akademiiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR). *Fiziologicheskii Zhurnal* (Kiev), vol. 28, July-Aug. 1982, p. 485-491. 59 refs. In Russian.

Studies of heart antigens in humans and other animals are reviewed, including work on heart specific antigens as well as antigens specific for other organs, such as the kidneys, liver, and skeletal muscles, in addition to the heart. The characteristics of heart specific antigens are summarized, and information about their intracellular localization is presented. In addition, the action of specific anti-heart antibodies on the heart is discussed. N.B.

A82-43671 † **Study of the morphological and biological properties of obligate and facultative psychrophilic bacteria found in the Antarctic (Izuchenie morfologicheskikh i biologicheskikh svoistv obligatnykh i facultativnykh psikhrofil'nykh bakterii, vydelennykh v usloviyah Antarktidi).** R. Iu. Tashpulatov, V. M. Bondarenko, and N. S. Dusmukhamedov. *Antarktika*, no. 20, 1981, p. 169-182, 184. 17 refs. In Russian.

A82-43674 **Vibration and comfort. III - Translational vibration of the feet and back. IV - Application of experimental results.** M. J. Griffin, K. C. Parsons, and E. M. Whitham (Southampton University, Southampton, England). *Ergonomics*, vol. 25, Aug. 1982, p. 705-719, 721-739. 42 refs.

The effect on human comfort of the frequency and direction of the translational vibration of a footrest and a flat firm backrest are investigated. The levels of fore and aft, and lateral and vertical vibration of the feet of seated subjects which causes discomfort equivalent to that from 0.8 m/s² r.m.s. 10 Hz vertical vibration of a firm flat seat are determined at frequencies ranging from 2.5-63 Hz. The levels of fore and aft, and lateral and vertical vibration at the back of a seat, equivalent to 0.8 m/s² r.m.s. 10 Hz vertical seat vibration, are also determined. Results are presented in the form of individual and group equivalent comfort contours. It is found that the contours for vibration of the back show a high sensitivity to fore and aft vibration. N.B.

A82-43675 **Variability in human response to whole-body vibration - The effects of instructions.** D. J. Oborne and P. A. Boarer (Swansea, University College, Swansea, Wales). *Ergonomics*, vol. 25, Aug. 1982, p. 759-769. 12 refs. Research supported by the Social Science Research Council.

Two studies are described in this paper with the aim of assessing the degree to which the instructions given to a subject during an experiment designed to investigate human reaction to vibration, affect the vibration equal sensation contour which is produced. In the first study, 100 subjects produced equal sensation contours by equating pairs of vibration stimuli. After each pair, subjects were required to record the basis on which they had made their judgments. The results demonstrated that subjects differ in the concepts which they use to equate vibration stimuli, although the majority equate in terms of the degree to which parts of the body are shaken. In the second study, 48 subjects were required to produce equal sensation contours using the terms of either 'comfort' or 'discomfort' or 'body shake' or 'sensation'. The overall contour shapes produced by the four instruction groups were not significantly different, although the frequency ranges of maximum vibration sensitivity were shown to be significantly different. Implications of these findings are discussed. (Author)

A82-44133 **Effects of beta-adrenergic receptor blockade on glycogenolysis during exercise.** A. C. Juhlin-Dannfelt, S. E. Terblanche, R. D. Fell, J. C. Young, and J. O. Holloszy (Washington University, St. Louis, MO). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 53, Sept. 1982, p. 549-554. 27 refs. Research supported by the Muscular Dystrophy Association and Swedish Society of Medical Sciences; Grant No. NIH-AM-18986.

The effects of beta-adrenergic receptor blockade on glycogen depletion is studied in rats during exercise. Results show that beta-adrenergic stimulation is not necessary for glycogen breakdown in skeletal muscle during prolonged exercise. Beta-adrenergic blockade does not inhibit liver glycogen depletion during exercise. In addition, it is found that the elevation of plasma free fatty acids partially inhibits the exercise induced decrease in glycogen concentration in the heart, and when elevation of free fatty acids and beta-blockade are combined, depletion of cardiac glycogen is almost completely prevented. Beta-blockade

markedly reduces glycogen depletion in the heart during exercise. It is concluded that beta-adrenergic stimulation is of major importance in mediating glycogenolysis in the heart but is not necessary for glycogenolysis in skeletal muscle or liver during prolonged exercise.

N.B.

A82-44134 Temperature effects on lung mechanics in air- and liquid-filled rabbit lungs. H. Inoue, C. Inoue, and J. Hildebrandt (Virginia Mason Research Center, Seattle, WA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 53, Sept. 1982, p. 567-575. 26 refs. Grant No. NIH-HL-14854.

The effects of temperature on lung pressure-volume curves and on the reversibility of changes in the lung tissues are studied in rabbit lungs in the temperature range 4-52 C. Air curves are obtained at 21 C, then at one of seven test temperatures (4, 21, 32, 37, 42, 47, and 52 C) after 60 minutes equilibrium, and finally again at 21 C. Peak inflation volume is made identical at all temperatures in a given lung. Results show that warming diminishes elastic recoil in air-filled lungs, but above 42 C a slight increase occurs, probably reflecting the transition zone of pure dipalmitoyl phosphatidylcholine. Liquid filled lungs also demonstrate considerable temperature dependency, but no transitions. In addition, all surface and tissue changes up to 47 C are found to be reversible, but those at 52 are not.

N.B.

A82-44135 Hemodynamic response to converting enzyme inhibition at rest and exercise in humans. R. Fagard, P. Lijnen, L. Vanhees, and A. Amery (Leuven, Katholieke Universiteit, Louvain, Belgium). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 53, Sept. 1982, p. 576-581. 33 refs. Research supported by the Instituut voor Wetenschappelijk Onderzoek of Belgium and Nationaal Fonds voor Wetenschappelijk Onderzoek.

The hemodynamic effects of Captopril is studied in six normal sodium-replete male subjects at rest and during exercise, together with the effects of the drug on the exercise capacity for graded uninterrupted exercise. Results show that the renin-angiotensin system is not involved in the homeostasis of blood pressure in supine sodium-replete humans, but has a modest role in blood pressure regulation when posture is changed from supine to upright. In addition, the orthostatic effect of Captopril is found to be maintained during upright exercise, and the reduction of systemic vascular resistance by Captopril does not affect peak oxygen uptake.

N.B.

A82-44136 Aortic body chemoreceptor responses to dopamine, haloperidol, and pargyline. N. J. Smatresk and S. Lahiri (Pennsylvania, University, Philadelphia, PA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 53, Sept. 1982, p. 596-602. 33 refs. Grant No. NIH-HL-19737-05.

The effect of exogenously administered dopamine (DA) and a dopaminergic blocker, haloperidol, on aortic chemoreceptor activity, from single or few-fiber afferent nerve preparations, is studied in 18 anesthetized cats. Results show that exogenously administered DA has an inhibitory effect on the aortic body chemoreceptors that is qualitatively similar to that seen in the carotid body. In addition, the endogenous release of DA is found to increase as the arterial partial pressure levels fall, as judged by DA antagonism with haloperidol. Exogenous DA produces an inhibition that appears to interact with arterial oxygen levels in a complex fashion for unknown reasons. No physiologically significant role in the degradation of endogenous DA at aortic body receptor sites is found to be played by monoamine oxidase.

N.B.

A82-44137 Hormone response of normal and intermittent cold-preadapted humans to continuous cold. M. W. Radomski and C. Boutelier (Institute of Environmental Medicine, Downsview, Ontario; Toronto, University, Toronto, Canada; Centre d'Essais en Vol, Laboratoire de Médecine Aérospatiale, Brétigny-sur-Ogre, Essonne, France). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 53, Sept. 1982, p. 610-616. 30 refs.

The hormonal and thermal responses of two groups of subjects were studied during 16 days in the Arctic (mean temperature -26.8 C), with one group (NPA) having received no prior cold exposure, while the other group (PA) was subjected to nine daily immersions (20-40 min) in cold water (15 C) for 20 days before the Arctic exposure. It was found that the NPA group showed an increase in metabolism and rectal temperature, while the PA group showed no elevation in metabolism and a decrease in rectal temperature. For the NPA group, Arctic exposure led to significant daily increases over the control period of urine volume, urinary norepinephrine, epinephrine, and 17-hydroxycorticosteroids, while only epinephrine increased in the PA group. It is concluded that the hormonal and thermal responses of the NPA group in the Arctic were characteristic of metabolic adaptation, whereas those in the PA group were suggestive of a hypothermic type of adaptation or habituation with no evidence of sympathetic or adrenocortical stimulation.

N.B.

A82-44138 Hypoxic pulmonary vasoconstriction and the size of hypoxic compartment. M. A. Zasslow, J. L. Benumof, and F. R. Trousdale (California, University, La Jolla, CA). *Journal of Applied Physiology: Respiratory,*

Environmental and Exercise Physiology, vol. 53, Sept. 1982, p. 626-630. 24 refs. Research supported by the University of California.

The relationship between the amount of hypoxic pulmonary vasoconstriction (HPV) and the size of the hypoxic test segment (TS) is studied in pentobarbital sodium-anesthetized mongrel dogs. Results show that as the percent of the cardiac output perfusing the TS increases, the expression of HPV changes from flow redistribution to perfusion pressure increase, but the overall magnitude of HPV does not change. In addition, at any given percentage of the cardiac output perfusing the TS, the limits of any given individual HPV response are wide.

N.B.

A82-44139 Effect of exercise conditioning on coronary resistance. I. Y. S. Liang and H. L. Stone (Oklahoma, University, Health Sciences Center, Oklahoma City, OK). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 53, Sept. 1982, p. 631-636. 19 refs. Grants No. NIH-HL-22154; No. NIH-HL-07430.

The diastolic coronary resistance (DCR) is measured in seven conscious dogs in the untrained state and after 4-5 weeks of daily exercise conditioning (partial training) in order to determine if daily exercise leading to a reduction in the coronary reactive hyperemic response produces any change in the DCR when myocardial oxygen demand is increased by atrial pacing. Also, the mechanism for any change in the DCR with atrial pacing is examined following adrenergic receptor blockage. Significant changes are found in the coronary flow, coronary resistance, and the reactive hyperemic response in partially trained animals. In addition, the evidence indicates a structural alteration in the vascular bed itself, possibly a change in the vessel caliber.

N.B.

A82-44140 Factors inducing periodic breathing in humans - A general model. M. C. K. Khoo, R. E. Kronauer, K. P. Strohl, and A. S. Slutsky (Harvard University, Cambridge; U.S. Veterans Administration Hospital, West Roxbury; Women's Hospital, Boston, MA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 53, Sept. 1982, p. 644-659. 39 refs. Research supported by the Medical Research Council of Canada and U.S. Veterans Administration; Grant No. NIH-HL-16325-05.

A general model is developed to account for all kinds of periodic breathing (PB) resulting from instability in respiratory control: in normals during sleep and on acute exposure to high altitude, in sleeping infants, and in patients with cardiovascular or neurologic lesions. It is found that in almost every case the ventilatory oscillation is mediated predominantly by the peripheral controller. System stability is decreased by hypoxia, hypercapnia, increased lung washout times, prolonged lung-chemoreceptor delays, and high controller sensitivity. Stability is enhanced by large lung CO₂ and O₂ storage volumes but little affected by body tissue stores. Using our own measurements of lung-ear delays, the model predicts that the mean cycle time of PB decreases from about 30 s at sea level to 20 s at 14,000 ft, in excellent agreement with data from other studies. Allometric scaling of the relevant parameters also shows close agreement between model predictions and data obtained in infants.

(Author)

A82-44141 A critical value for O₂ transport in the rat. R. P. Adams, L. A. Dieleman, and S. M. Cain (Alabama, University, Birmingham, AL). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 53, Sept. 1982, p. 660-664. 8 refs. Research supported by the Stichting De Drie Lichten of Netherlands; Grants No. NIH-HL-14693; No. NIH-HL-26927.

Intact anesthetized rats are ventilated under hypoxic, normoxic, and hyperoxic conditions while either normovolemic or hypovolemic, and the point at which the whole-animal skeletal muscle oxygen uptake becomes dependent on total oxygen transport (TOT) is determined. By so doing, a wide range of TOT values both above and below the range normally observed are obtained, and a critical value of TOT can be identified with respect to whole-body skeletal muscle oxygen uptake. No dependence of whole-body skeletal muscle oxygen uptake is found in the range of transport from approximately 23-80 ml/kg-min in anesthetized rats. Only below that range does the skeletal muscle oxygen uptake become dependent on transport. It is concluded that skeletal muscle oxygen uptake in the rat, as in the dog and other larger animals, is not normally transport limited during normoxic or hyperoxic conditions.

N.B.

A82-44142 Modification of training-induced responses by repeated norepinephrine injections in rats. M. Harri, P. Kuusela, and R. Oksanen-Ross (Kuopio, University, Kuopio, Finland). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 53, Sept. 1982, p. 665-670. 28 refs. Ministry of Education of Finland Grants No. 9040/78/79; No. 9449/78/80.

The effect of increased sympathetic influence, produced by repeated injections of norepinephrine, during exercises on the development of exercise-induced adaptive changes in rats is investigated. Results showed that the training specific changes (increased activity of oxidative muscle enzymes) were not potentiated by training under the influence of exogenous norepinephrine administration. While norepinephrine injections alone produced hypertrophy of the brown adipose tissue and increased colonic temperature response to isoproterenol, these changes failed to develop if the rats underwent physical training in addition to drug treatment. Norepinephrine treatment produced lower tail skin temperatures in a cool environment (15 C) with or without simultaneous training. It is concluded that the

chronic norepinephrine treatment and physical training combination led to complex adaptive changes that could not be systematically associated with either norepinephrine treatment or physical training alone. N.B.

A82-44143 Hyperoxia inhibits stimulated superoxide release by rat alveolar macrophages. H. J. Forman, J. J. Williams, J. Nelson, R. P. Daniele, and A. B. Fisher (Pennsylvania, University, Philadelphia, PA). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 53, Sept. 1982, p. 685-689. 26 refs. Grants No. NIH-HL-15061; No. NIH-HL-23790.

A82-44144 Regulation of glycogenolysis in human muscle at rest and during exercise. D. Chasiotis, K. Sahlin, and E. Hultman (Huddinge University Hospital, Huddinge, Sweden). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 53, Sept. 1982, p. 708-715. 37 refs. Research supported by the Medicinska Forskningsrådet and Swedish National Association Against Rheumatism. MF Project 2647.

The mechanism for the increased glycogenolysis during exercise is studied in human muscle by measuring the activities of phosphorylase and synthase as well as the concentration of the activators AMP, IMP, and inorganic phosphate. Results show that the total glycogen phosphorylase and synthase activities are unchanged during exercise, while the activity of phosphorylase α at rest is low and critically dependent on the concentration of inorganic phosphate in the muscle. Phosphorylase α is found to increase initially 2.4 fold during isometric contraction and 1.6 fold during maximal bicycle exercise, but reverts to or below the resting value at fatigue/exhaustion. Synthetase I comprises 17-48% of the total activity at rest, but decreases during exercise to about half of this value. The reciprocal changes in phosphorylase and synthase are found to be correlated with the enhanced rate of glycogenolysis during exercise. It is concluded that the concentration of inorganic phosphate is one of the main factors determining phosphorylase activity and provides a link between phosphocreatine breakdown and glycogen utilization in muscle. N.B.

A82-44145 Protein kinase activity in liver of heat-acclimated hamsters. R. Chayoth, M. Aharon, and Y. Graziani (Negev, University, Beersheva, Israel). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 53, Sept. 1982, p. 716-718. 28 refs.

Protein kinase activity, potential changes in the activities of phosphorylase kinase and phosphorylase α during heat acclimation, and the cAMP dependence of protein kinases are investigated in liver slices from heat acclimated (35°C) and control (23°C) hamsters. Results show that the protein kinase activity in heat acclimated (HA) hamsters is 70% higher than in similar slices from control (C) hamsters, while adding glucagon to the incubation medium increased protein kinase activity by 65% for C animals but by only 30% for HA animals. The binding of tritium-labelled cAMP to proteins of a low-speed supernatant fraction of incubated and homogenized slices is 30% lower for HA than for C animals, while the addition of glucagon decreased the binding by 30% for each group. The activities of phosphorylase kinase, phosphorylase phosphatase, and phosphorylase α incubated with or without glucagon does not differ between groups. It is concluded that heat acclimation of the hamster increases the amount of a species of liver protein kinase that is different from the one that mediates the effect of glucagon on glycogenolysis. N.B.

A82-44146 Effect of heat stress on cutaneous vascular responses to the initiation of exercise. J. M. Johnson and M. K. Park (Texas, University, Health Science Center, San Antonio, TX). *Journal of Applied Physiology: Respiratory, Environmental and Exercise Physiology*, vol. 53, Sept. 1982, p. 744-749. 29 refs. Grant No. NIH-HL-20663.

The competition between the vasoconstrictor and vasodilator reflexes in the regulation of skin blood flow is studied by investigating the responses in the forearm blood flow (FBF) to the initiation of supine leg exercises as determined by plethysmography against a background of rising internal temperature. Results show that FBF falls significantly with the beginning of each period of exercise, and the amount by which FBF falls increases with increasing levels of preexercise FBF. It was determined that these responses are not due to changes in internal temperature as reflected by esophageal temperatures, although individual studies occasionally showed a reduction or abolition of the vasoconstrictor response with the last period of exercise. It is concluded that these findings are in agreement with earlier studies showing a cutaneous participation in the vasoconstrictor responses to exercise, but they also indicate that sufficient hyperthermia can attenuate or even abolish this response. N.B.

A82-44290 Dynamic preload as an impact protection concept. J. H. Raddin, Jr. (USAF, Aeronautical Systems Div., Wright-Patterson AFB, OH) and B. F. Hearon (USAF, Aerospace Medical Research Laboratories, Wright-Patterson AFB, OH). *SAFE Journal*, vol. 12, Fall 1982, p. 5-10. 5 refs.

Results of matched human impact exposures on a decelerator (with a preload of about 0.3 G) and an accelerator (with no preload) are presented, showing that the forces imposed on human subjects in impacts preceded by even a minimal dynamic preload were decreased in comparison to those in which the dynamic preload is zero. In tests with sled accelerations of 8 and 10 G's, head acceleration

was 47 and 31 percent higher respectively for impacts without preload than for those with it, and the head severity index was up 88 and 56 percent. Statistically significant increases in resultant strap loads, lap belt loads and seat pan loads were also observed. So means should be sought to intentionally impose preload as a protective technique in impact exposures. A.B.

A82-44292 Head cooling and heat. D. C. Reader, S. A. Nunneley, and R. J. Maldonado (USAF, School of Aerospace Medicine, Brooks AFB, TX). *SAFE Journal*, vol. 12, Fall 1982, p. 18-22.

The effects of head and body cooling during hyperthermia were investigated to determine whether head cooling alone would overcome some of the problems of heat stress. Measurements of body temperature, heart rate, psychomotor performance and subjective comfort were made during cycles of head and body heating and cooling. Heart rates were highest with head and body heating, less with head cooling, and lowest with head and body cooling. Decreased reaction time and increased errors occurred during head and body heating, but head cooling returned performance to near control levels. While head cooling is not a substitute for full body cooling or cabin conditioning, it may be a useful alternative for reducing the effects of heat stress on aircrew performance. A.B.

A82-44450 * Polyamines and plant stress - Activation of putrescine biosynthesis by osmotic shock. H. E. Flores and A. W. Galston (Yale University, New Haven, CT). *Science*, vol. 217, Sept. 24, 1982, p. 1259-1261. 23 refs. Research supported by the Gational Agricultural Research and Development Foundation and NASA.

The putrescine content of oat leaf cells and protoplasts increases up to 60-fold within 6 hours of exposure to osmotic stress (0.4 to 0.6 molar sorbitol). Barley, corn, wheat, and wild oat leaves show a similar response. Increased arginine decarboxylase activity parallels the rise in putrescine, whereas ornithine decarboxylase remains unchanged. DL-alpha-Difluoromethylarginine, a specific irreversible inhibitor of arginine decarboxylase, prevents the stress-induced rise in increase in arginine decarboxylase activity and putrescine synthesis, indicating the preferential activation of this pathway. (Author)

A82-44512 * Design and evaluation of an onboard computer-based information system for aircraft. S. H. Rouse, W. B. Rouse, and J. M. Hammer (Georgia Institute of Technology, Atlanta, GA). *IEEE Transactions on Systems, Man, and Cybernetics*, vol. SMC-12, July-Aug. 1982, p. 451-463. 18 refs. Grant No. NSG-2119.

Information seeking by human operators of technical systems is considered. Types of information and forms of presentation are discussed and important issues reviewed. This broad discussion provides a framework within which flight management is considered. The design of an onboard computer-based information system for aircraft is discussed. The aiding possibilities of a computer-based system are emphasized. Results of an experimental evaluation of a prototype system are presented. It is concluded that a computer-based information system can substantially lessen the frequency of human errors. (Author)

A82-44513 Information automation and the Apollo program - A retrospective. J. G. Wohl (Alphatech, Inc., Burlington, MA). *IEEE Transactions on Systems, Man, and Cybernetics*, vol. SMC-12, July-Aug. 1982, p. 469-478. 19 refs.

The information revolution currently in progress is raising concerns about introducing computers and automation into peoples' lives. A review is in this connection presented of the problems and techniques associated with introducing computers into the prelaunch test and checkout activities of the Apollo Manned Lunar Landing program. This review has been provided in retrospective in the hope that some of the principles and concepts in an earlier and highly successful program will find an application to the not-so-different world of today and tomorrow. The examples demonstrate that a computer can be used to serve human needs for real-time information management, processing, and display in ways which keep people very much 'in-the-loop'. The methods described were specifically designed to compensate for normal human limitations in attention allocation, short-term memory, and information processing rate, and to exploit human ability to recognize unusual or unprogrammed events. G.R.

A82-44514 A finite-state description of coordination in a two-handed target acquisition task. R. A. Miller, R. J. Jagacinski, W. W. Johnson (Ohio State University, Columbus, OH), and R. B. Nalavade (Rochester Institute of Technology, Rochester, NY). (*Human Factors Society, Annual Meeting, 25th, Rochester, NY, Oct. 12-16, 1981.*) *IEEE Transactions on Systems, Man, and Cybernetics*, vol. SMC-12, July-Aug. 1982, p. 529-538. 19 refs. Grant No. AF- AFOSR-78-3697.

A position control stick with one hand and a velocity control stick with the other hand were manipulated in order to capture a moving target displayed on an oscilloscope screen. The two control sticks were additively coupled. In order to understand the coordination of the two control sticks, event-based first-order Markov 'activity sequence generators' were constructed for individual subjects. These discrete probabilistic structures are closely related to each subject's overall plan or general strategy for the capture task. Striking individual differences and

strategic errors in performance were revealed. When combined with additional time-conditioned (open-loop) and error-conditioned (closed-loop) details, the activity sequence generators provide a basis for a hierarchic description of this perceptual-motor skill.
(Author)

A82-44658 # Regenerable life support for the space station - A technology status summary. T. W. Herrala and G. N. Kleiner (United Technologies Corp., Hamilton Standard Div., Windsor Locks, CT). *International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept. 27-Oct. 2, 1982, Paper 82-45.* 8 p.

Regenerable environmental control and life support (ECLS) subsystems for use with STS are reviewed along with the candidate technologies currently being considered. Water processing and management is able to provide a major savings in launch weight for extended missions; vapor compression distillation and thermoelectrically integrated membrane evaporation are the major approaches being developed, and both are in the preprototype phase. Carbon dioxide removal and collection is possible using a molecular sieve, solid amine desorption, or an electrochemical concentrator, and the molecular sieve method has been flight qualified already. Sabatier, Bosch, and solid electrolyte processes are being considered for carbon dioxide reduction. A number of electrolysis methods are possible for maintaining the oxygen supply which employ different vapor or liquid water sources. Other subsystems for which the technology has been flight qualified include cabin ventilation and temperature control, heat transport, and extra-vehicular activity support.
A.B.

A82-44684 # Medical monitoring and therapy of space motion sickness. K. E. Money (Defence and Civil Institute of Environmental Medicine, Downsview, Ontario, Canada) and C. M. Oman (MIT, Cambridge, MA). *International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept. 27-Oct. 2, 1982, Paper 82-169.* 7 p. 46 refs.

The nature of motion sickness in space, its monitoring and treatment are reviewed. While the signs of motion sickness are malaise, pallor, cold sweating, nausea, and vomiting, the monitoring of this sickness in space has been largely confined to reports from astronauts. Techniques for the electric monitoring of pallor and cold sweating have been developed for experimental studies of motion sickness on earth, and similar equipment for monitoring these responses are being developed for applications in space. Also discussed are the special training plans proposed for astronauts before the early Spacelab missions in order to enable careful self-monitoring of certain autonomic phenomena by biofeedback. Therapy includes preflight habituation and drug selection, and in space, drugs, immobility, and time are used.
N.B.

A82-44685 # Habitability support for manned missions of space 2000. G. L. Murphy (McDonnell Douglas Astronautics Co., Huntington Beach, CA). *International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept. 27-Oct. 2, 1982, Paper 82-170.* 9 p. 6 refs.

The need to emphasize habitability in the design of future manned space vehicles is stressed as a means of enhancing productivity, motivation, crew morale, and acceptance of longer space stay times and shorter earth stay times between flights. Aspects which must be considered include longer mission duration and diverse crew composition (a factor which requires psychological, social, and cultural considerations). In addition, specific personal needs are mentioned, such as privacy, recreation, cleanliness and grooming, and separation of work and leisure time. Habitability data have been collected based on long-term space flights, ground confinement studies, comparative literature, and research by specialists. Data show the need for specification of zero-g posture, the most effective means of locomotion, and the most satisfying off-duty activity (looking out the window). In order to develop a habitable environment, it is suggested that a data base be established, and that engineering design data and techniques for evaluating habitats be developed.
R.K.R.

A82-44686 # Psychophysiological performance examination on-board the orbital complex Salyut-Soyuz. J. Hideg, L. Bognar, P. Remes (Hungarian Academy of Sciences, Intercosmos Council, Budapest, Hungary), O. P. Kozarenko, V. I. Miasnikov, and I. P. Ponomareva (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept. 27-Oct. 2, 1982, Paper 82-171.* 6 p. 9 refs.

Studies of the psychic performance of three crews aboard the orbital station Salyut-6, measured by an instrument called the Balatron, are reviewed. The results of these studies show that the speed of information processing decreases in the case of cosmonauts flying for the first time, and the emotional tension significantly increases at the very beginning of the adaptation to weightlessness, while these responses are less pronounced in the case of experienced cosmonauts. The sensory-motor reaction time and the four-choice reaction time notably lengthen and the information processing ability decreases at the beginning of the postflight period. The indices of the psychic work capacity quickly return to normal after the flight, and the emotional tension level becomes stable within five days.
N.B.

A82-44687 * # Medical support and technology for long-duration space missions. S. Furukawa (McDonnell Douglas Technical Services Co., Inc., Cocoa Beach, FL), A. Nicogossian (NASA, Washington, DC), P. Buchanan (NASA, Kennedy Space Center, Cocoa Beach, FL), and S. L. Pool (NASA, Johnson Space Center, Houston, TX). *International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept. 27-Oct. 2, 1982, Paper 82-174.* 9 p. 6 refs.

The current philosophy and development directions being taken towards realization of medical systems for use on board space stations are discussed. Data was gained on the performance of physical examinations, venipuncture and blood flow, blood smear and staining, white blood cell differential count, throat culture swab and colony count, and microscopy techniques during a 28-day period of the Skylab mission. It is expected that the advent of Shuttle flights will rapidly increase the number of persons in space, create a demand for in-space rather than on-earth medical procedures, and necessitate treatments for disorders without the provision for an early return to earth. Attention is being given to pressurized environment and extravehicular conditions of treatment, the possibilities of the use of the OTV for moving injured or ill crewmembers to other space stations, and to isolation of persons with communicable diseases from station crews.

M.S.K.

A82-44688 # Catecholamines and their enzymes in discrete brain areas of rats after space flight on biosatellites Cosmos. R. Kvetnansky, J. Culman, T. Torda, L. Macho (Slovenska Akademia Vied, Ustav Experimentalnej Endokrinologie, Bratislava, Czechoslovakia), L. V. Serova, and R. A. Tigranian (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept. 27-Oct. 2, 1982, Paper 82-180* 8 p. 33 refs.

The influence of stressful factors and of long periods of weightlessness on the activity of the catecholaminergic system in the brains of rats is investigated during 18.5-19.5 day flights on Cosmos biosatellites. In two experiments, the concentration of norepinephrine and the activities of tyrosin hydroxylase, dopamine-beta-hydroxylase, and monamine oxidase were measured in the total hypothalamus, and were found not to have changed after space flight. In a subsequent experiment, the concentrations of norepinephrine, epinephrine, and dopamine were studied in isolated nuclei of the hypothalamus of rats within 6 to 10 hours following the return from space. It was found that norepinephrine was significantly reduced in the arcuate nucleus, median eminence, and periventricular nucleus, and epinephrine was reduced in the median eminence, and in the periventricular and suprachiasmatic nuclei, whereas dopamine was not significantly changed after space flight. It was concluded that the decreased catecholamine levels indicate that no chronic intensive stress factors acted during the flights, and that this decrease was induced by the effect of a stressogenic factor acting for a short time only, most likely during or immediately after landing.
N.B.

A82-44689 # The first joint Franco-Soviet manned flight - The posture experiment (Premier vol habité Franco-Soviétique - L'expérience posture). F. Lestienne, G. Clément (CNRS, Laboratoire de Physiologie Neurosensorielle, Paris, France), V. Gurinkel (Akademiia Nauk SSSR, Institut Problem Perekhod Informatsii, Moscow, USSR), R. Capraro (Centre National d'Etudes Spatiales, Toulouse, France), V. Kojarinov, A. Lepsky (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR), and J. L. Lafon (Société Berlin et Cie., Plaisir, Yvelines, France). *International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept. 27-Oct. 2, 1982, Paper 82-183.* 7 p. 14 refs. In French.

The apparatus, procedures, and results of the posture experiment to test the sensorimotor interactions linked to postural control in weightless conditions on board the Salyut 7 space station during a seven-day mission are reported. The experiment comprised observation of postural adjustments enacted during elevation of the arms in conditions of varying visual limits and mechanical stresses. Specific attention was given to reflex activities of postural muscles, any increase in visual dependence, and persistence of motor programs. The subject stood on a platform and, at the sound of a signal, moved his arms towards a target, sometimes carrying a 1-kg mass. Trials were performed which involved the wearing of glasses which blocked the total vision, the peripheral vision, or permitted tunnel vision. Monitoring was carried out for muscle rigidity, leg muscle myographic signals, angle of the feet, speed of arm movement, stability of the feet, and arm used, and 16 mm movies were made. The soleus muscle was found to equally activate during weighted and nonweighted movements, and peripheral vision was found to be prominent in postural control.
M.S.K.

A82-44690 # Possible adaptation to strong magnetic fields. Z. N. Nakhilitskaia, L. D. Klimovskaia, Z. F. Kuzmina, V. M. Mastrukova, N. P. Smirnova, A. D. Strzhizhovskii, and G. V. Cherkasov (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept. 27-Oct. 2, 1982, Paper 82-188.* 4 p. 5 refs.

Animal adaptation to a strong magnetic field was investigated. Mice were exposed to 30-day total-body continuous effects of a constant magnetic field

A82-44708

(CMF) of 1.6 T, and their physiological responses were assessed. Analysis of the data obtained showed that different parameters varied in a dissimilar manner. Red blood changes returned to normal in the course of the experiment. Leucocytosis and increased content of catecholamines and corticosterone of blood and adrenals persisted throughout the exposure. Changes in the spermatogenic epithelium were most distinct after the exposure. The recovery of certain parameters during the CMF exposure is indicative of adaptation of some physiological systems. The adaptation is, however, incomplete as suggested by the long persisting stress manifestations. Reticulocytopenia and spermatogenetic abnormalities found after the exposure are of particular importance. Animal and human adaptation to strong magnetic fields is attracting greater attention of researchers in space biology and medicine in view of future space flights. The possibility of applying magnetic devices in space rocketry (magnetohydrodynamic engines, magnetic energy accumulators, strong magnets used in assembly operations in orbit, magnetic radiation protection systems) makes the magnetic protection of crewmembers one of the important problems of space medicine. (Author)

A82-44708 # Planetary atmospheres and the search for life. T. Owen (New York, State University, Stony Brook, NY). *International Astronautical Federation, International Astronautical Congress, 33rd, Paris, France, Sept. 27-Oct. 2, 1982, Paper 82-268.* 23 p.

The search for life on other planets is considered through comparative studies of planetary atmospheres. It is suggested that planetary atmospheres are necessary for life, based on moon and Mars explorations, and water and carbon are considered to be the essential elements. Other atmospheric constituents such as methane, ammonia, and hydrogen sulfide are considered in terms of atmospheric origins. It is found that the atmospheric development process requires a solid surface in order to provide a place where chemicals can react after formation, implying that this is a necessary condition for the origin of life. Although these conditions are characteristic of other planetary bodies within our solar system, earth is the only body warm enough and of the right size to allow water to be liquid and to have acquired a large enough store of volatiles. Tables of atmospheric composition are included.

R.K.R.

A82-44823 Absence of depth processing in the large-frame rod-and-frame effect. S. M. Ebenholtz (Wisconsin, University, Madison, WI) and G. W. Glaser (Rhode Island School of Design, Providence, RI). *Perception and Psychophysics*, vol. 32, no. 2, Aug. 1982, p. 134-140. 21 refs. Grant No. NIH-EY-02264.

Attenuation of the rod-and-frame effect with depth separation was investigated with the rod and frame in either intersecting or parallel depth planes (PDP). In the former case, in which either the top of the rod or the frame was inclined 45 deg away from the observer, no attenuation was found for frames projecting a retinal angle of 39.2 or 13.5 deg. In the PDP paradigm, the rod was optically 60 cm nearer the observer than was the frame. The depth adjacency effect of Gogel and Newton (1975) was replicated, but only for small retinal angles (7.2 and 6.8 deg) of the frame and for a 15-deg frame tilt, but not for larger retinal angles (39.2 and 12.7 deg) or for frames tilted at 22 deg. The absence of attenuation with depth separation in large frames and its presence in small frames is consistent with the identification of these phenomena with properties of the ambient and focal visual systems, respectively.

C.D.

A82-44824 Inhibition of the rod-and-frame effect by circular contours. S. M. Ebenholtz and J. W. Utriel, Jr. (Wisconsin, University, Madison, WI). *Perception and Psychophysics*, vol. 32, no. 2, Aug. 1982, p. 199, 200. 12 refs.

The influence of a frame on orientation perception was studied. Twenty-four volunteers took part in a task whose aim was to adjust a luminous rod to the egocentric vertical. The rod rotated about an axis at the center of the tilted frame. Differences in the frame-present and frame-absent settings defined the rod-and-frame effect (RFE). Both high and low scorers were significantly influenced by the circumscribing patterns. It is found that the presence of the circular pattern around the frame inhibits the influence of the tilted frame on egocentric orientation.

C.D.

STAR ENTRIES

N82-30833*# Massachusetts Inst. of Tech., Cambridge.
PROCEEDINGS OF THE SIXTEENTH ANNUAL CONFERENCE ON MANUAL CONTROL

1980 643 p refs Conf. held at Cambridge, Mass., 5-7 May 1980 Sponsored by NASA, Ames Research Center (NASA-CR-169243; NAS 1.26:169243) Avail: NTIS HC A99/MF A01 CSCL 05H

Operator modeling is reviewed. Measurement of human response is considered. Pilot/operator opinion is also considered. The effects of motion are reviewed. Aircraft displays are discussed. Supervisory control is considered. Automobile driving and remote manipulation are also considered. For individual titles, see N82-30834 through N82-30870.

N82-30834*# Illinois Univ., Chicago. Coll. of Engineering.
MODELING OF HUMAN OPERATOR DYNAMICS IN SIMPLE MANUAL CONTROL UTILIZING TIME SERIES ANALYSIS

Gyan C. Agarwal, Frank Osafo-Charles, William D. O'Neill, and Gerald L. Gottlieb *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 1-28 refs Prepared in cooperation with Rush-Presbyterian-Saint Luke's Medical Center, Chicago, Ill.

(Grants NSF ENG-76-08754; NS-00196; NS-12877)

Avail: NTIS HC A99/MF A01 CSCL 05H

Time series analysis is applied to model human operator dynamics in pursuit and compensatory tracking modes. The normalized residual criterion is used as a one-step analytical tool to encompass the processes of identification, estimation, and diagnostic checking. A parameter constraining technique is introduced to develop more reliable models of human operator dynamics. The human operator is adequately modeled by a second order dynamic system both in pursuit and compensatory tracking modes. In comparing the data sampling rates, 100 msec between samples is adequate and is shown to provide better results than 200 msec sampling. The residual power spectrum and eigenvalue analysis show that the human operator is not a generator of periodic characteristics. Author

N82-30835*# Systems Research Labs., Inc., Dayton, Ohio.
A GUNNER MODEL FOR AN AAA TRACKING TASK WITH INTERRUPTED OBSERVATIONS

C. F. Yu, K. C. Wei, and M. M. Vikmanis (Aerospace Medical Research Lab.) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 29-39 refs

(Contract F33615-79-C-0500)

Avail: NTIS HC A99/MF A01 CSCL 05H

The problem of modeling a trained human operator's tracking performance in an anti-aircraft system under various display blanking conditions is discussed. The input to the gunner is the observable tracking error subjected to repeated interruptions (blanking). The effect of blanking on the gunner's tracking performance is modeled via the observer and controller gains. Author

N82-30836*# Analytical Mechanics Associates, Inc., Mountain View, Calif.

MODELING HUMAN TARGET ACQUISITION IN GROUND-TO-AIR WEAPON SYSTEMS

A. V. Phatak, R. L. Mohr, M. M. Vikmanis (Aerospace Medical Research Lab.), and K. C. Wei (Systems Research Lab., Dayton Ohio) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 40-48 refs

Avail: NTIS HC A99/MF A01 CSCL 05H

Several models were developed for describing human operator input-output behavior in ground-to-air target tracking tasks. The problems associated with formulating and validating mathematical models for describing and predicting human target acquisition response are considered. The extension of the human observer model to include the acquisition phase as well as the tracking segment is presented. Relationship of the observer model structure to the more complex standard optimal control model formulation and to the simpler transfer function/noise representation is discussed. Problems pertinent to structural identifiability and the form of the parameterization are elucidated. A systematic approach towards the identification of the observer acquisition model parameters from ensemble tracking error data is presented. Author

N82-30837*# National Aerospace Lab., Amsterdam (Netherlands).

THE EFFECT OF VISUAL INFORMATION ON THE MANUAL APPROACH AND LANDING

P. H. Wewerink *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 49-65 refs

Avail: NTIS HC A99/MF A01 CSCL 05H

The effect of visual approach and landing information in combination with basic display information on the approach performance is examined. A pre-experimental model analysis was performed in terms of the optimal control model. Aircraft approach performance predictions were compared with the results of a moving base simulator program. Author

N82-30839*# National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

PURSUIT TRACKING AND HIGHER LEVELS OF SKILL DEVELOPMENT IN THE HUMAN PILOT

Ronald A. Hess *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 92-105 refs

Avail: NTIS HC A99/MF A01 CSCL 05I

A model of the human pilot is offered for pursuit tracking tasks; it encompasses an existing model for compensatory tracking. The central hypothesis in the development of this model states that those primary structural elements in the compensatory model responsible for the pilot's equalization capabilities remain intact in the pursuit model. The sharp reduction in low-frequency phase lag beyond that associated with the disappearance of phase droop is seen to accompany relatively low-gain feedback of vehicle output. The results of some recent motion cue research are discussed and interpreted in terms of the compensatory-pursuit display dichotomy. Preview is shown to demand no fundamental changes in structure or equalization, and to allow the pilot to eliminate the effective time delays that accrue in the inversion of the controlled-element dynamics. Precognitive behavior is discussed and a model that encompasses all the levels of skill development outlined in the successive organizations of perception (SOP) theory is finally proposed. Author

N82-30841*# Tokyo Univ. (Japan). Dept. of Aeronautics.
AN EXPERIMENTAL STUDY OF HUMAN PILOT'S SCANNING BEHAVIOR

Kyuchiyo Washizu, Keiji Tanaka (National Aerospace Lab., Tokyo), and Tatsuo Osawa *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 128-133 refs

Avail: NTIS HC A99/MF A01 CSCL 05H

The scanning behavior and the control behavior of the pilot who manually controls the two-variable system, which is the most basic one of multi-variable system, which is the most basic one of multi-variable systems are investigated. Two control tasks, which simulate the actual airplane attitude and airspeed control are reported. In order to simulate the change of the situation where the pilot is placed, such as changes of flight phase, mission and others, the subject was requested to vary the wrightings, as his control strategy, upon each task. Changes of human control dynamics and his scanning properties caused by the modification of the situation were investigated. Author

N82-30842

N82-30842* Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany). Dept. of Human Factors Engineering and Simulation.

PARAMETRIC IDENTIFICATION OF HUMAN OPERATOR MODELS

Norbert R. Ninz *In* MIT Proc. of the 16th Ann. Cong. on Manual Control 1980 p 137-145 refs

Avail: NTIS HC A99/MF A01 CSCL 05H

The accurate and efficient identification of the human operator is still a need in human factors engineering especially concerning multivariable control. Control theoretic identification methods need to be tested with human operator models under realistic boundary conditions. The requirements and criteria for the use of parametric methods, selected models as well as the Maximum Likelihood Method and the Extended Kalman Filter are displayed. The experiments and results are comparatively discussed from the point of practical engineering. Author

N82-30843* Georgia Inst. of Tech., Atlanta. Systems Engineering Lab.

A COMPUTER SIMULATION APPROACH TO MEASUREMENT OF HUMAN CONTROL STRATEGY

Joanne Green, Esther Lee Davenport, Harold F. Engler, and William E. Sears, III *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 146-171 refs

(Contract N00014-75-C-0432)

Avail: NTIS HC A99/MF A01 CSCL 05H

Human control strategy was measured through use of a psychologically based computer simulation which reflects a broader theory of control behavior. The simulation is called the human operator performance emulator (HOPE). HOPE was designed to emulate control learning in a one-dimensional preview tracking task and to measure control strategy in that setting. HOPE generates control stick behavior corresponding to that which might be used by a person learning preview tracking. Author

N82-30844* Massachusetts Inst. of Tech., Cambridge.

SUBJECTIVE SCALING OF MENTAL WORKLOAD IN A MULTI-TASK ENVIRONMENT

Bahman Daryanian *In* its Proc. of the 16th Ann. Conf. on Manual Control 1980 p 172-188 refs

Avail: NTIS HC A99/MF A01 CSCL 05I

The results of a mental workload experiment which was carried out in a simulated multi-task environment are reported. The experiment developed and examined a method that would qualitatively and quantitatively identify those factors in a multi-task environment that contribute to the operators' sense of mental workload. Thurstone's law of comparative judgment was employed to construct in interval scales of subjective mental workload from paired comparisons data. L.F.M.

N82-30845* San Jose State Univ., Calif.

EFFECT OF COUNTING AND TRACKING ON VERBAL AND PRODUCTION METHODS OF TIME ESTIMATION

Kathleen L. Bird and Sandra Hart *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 199-211 refs Prepared in cooperation with Tufts Univ., Medford, Mass.

(Contract NCC-2-34; Grant NsG-2156)

Avail: NTIS HC A99/MF A01 CSCL 05I

The effects of time estimation technique and task condition on the production and verbal estimation of time intervals ranging from 5 to 14 sec were investigated. Sixteen male college students were randomly assigned to two groups, each of which utilized a different estimation method: (a) production; or (b) verbal estimation. The subjects were instructed either to produce or to give a verbal estimate of the duration of these time intervals during each task condition: (a) pretracking, (b) tracking (subject performed a one-axis tracking task), and (c) posttracking. Each subject used each of the two estimation techniques: (a) vocal counting and (b) no counting. The ratio of the subject's time estimate to actual interval length was computed for each trial. Productions were typically longer than verbal estimates of the same duration and produced durations were typically too long whereas verbal estimates were too short relative to the correct duration. A significant interaction was found between counting technique and tracking condition for both estimation methods. A significant effect could be attributed to the addition of a tracking task. Author

N82-30846* Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

A MODEL BASED TECHNIQUE FOR PREDICTING PILOT OPINION RATINGS FOR LARGE COMMERCIAL TRANSPORTS

William H. Levison *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 216-242 refs

(Contract NAS1-15529)

Avail: NTIS HC A99/MF A01 CSCL 05I

A model-based technique for predicting pilot opinion ratings is described. Features of this procedure, which is based on the optimal-control model for pilot/vehicle systems, include: (1) capability to treat 'unconventional' aircraft dynamics, (2) a relatively free-form pilot model, (3) a simple scalar metric for attentional workload, and (4) a straightforward manner of proceeding from descriptions of the flight task environment and requirements to a prediction of pilot opinion rating. The method was able to provide a good match to a set of pilot opinion ratings obtained in a manner simulation study of large commercial aircraft in landing approach. Author

N82-30847* National Aerospace Lab., Tokyo (Japan). Instrumentation and Control Div.

AN ANALYTICAL PREDICTION OF PILOT RATINGS UTILIZING HUMAN PILOT MODEL

Keiji Tanaka and Kyuichiro Washizu *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 243-253 refs Prepared in cooperation with Tokyo Univ.

Avail: NTIS HC A99/MF A01 CSCL 05I

In order to analytically predict pilot ratings, an evaluation method of a manual control system which consists of an aircraft and a human pilot, is proposed and examined. The method is constructed upon the assumptions that the control mission determines the critical frequency the pilot should bring to his focus, and that the degree of closed-loop stability and the human compensation necessary to attain the stability determine the human subjective evaluation of the system. As a result, a simple evaluation chart is introduced. The chart enables us to predict the subjective evaluation, if the controlled element dynamics and the mission are given. The chart is in good accord with almost all of the existing results of pilot ratings. This method has the following four advantages: (1) Simplicity, in a sense that the method needs to evaluate only two typical controlled element parameters, namely, the gain slope and the phase at the critical control frequency; (2) Applicability to unstable controlled elements; (3) Predictability of controllability limits of manual control; (4) Possibility of estimating human compensatory dynamics. Author

N82-30852* Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

A PERFORMANCE ANALYSIS STUDY OF A COMPLEX G FIELD EXPERIMENT

D. W. Repperger *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 292-315 refs

Avail: NTIS HC A99/MF A01 CSCL 06S

A performance study was conducted on human tracking under a complex field. Three important points are illustrated. First it shows the connection between the phase plane boundary points and window measures through the use of cumulative distribution function (CDF) on the data. Secondly, the effects of stress on tracking performance manifests itself via the t tests across CDF's under two experimental conditions. It is shown for one subject and 4 replications that there exists a significant performance degradation due to stress. A third point made by this paper is that a K-S test on the distributions of the phase plane trajectories indicate the nonnormality of the empirical density functions. This statement can be made with greater than 99% confidence. It is interesting in this case to have such a result hold for a tracking task which is sum of sines and to contrast this result to the deterministic case considered. L.F.M.

N82-30853* Systems Technology, Inc., Hawthorne, Calif.

A SOFTWARE PACKAGE FOR EVALUATING THE TRANSMISSIBILITY BETWEEN VEHICLE VIBRATION AND MOTIONS OF HANDS (IN CONTROLS), LIMB, HEAD AND EYES

Susan A. Riedel, Henry R. Jex, and Raymond E. Magdaleno *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980

p 317-339 refs

(Contract F33615-79-C-0519)

Avail: NTIS HC A99/MF A01 CSCL 05H

A user oriented computer program for exercising the 1980 version of the STI biodynamic model BIODYN-80 was completed. The user inputs some 80-100 variables describing the assumed posture, interface characteristics (e.g., stick feel), and vestibular characteristics. The computer calculates the transfer functions between vibration input and various selected outputs of interest to the user. Another option is to output the operator's torso-limb-neuromuscular loop transmissibilities as seen at the stick, as required for the AMRL/BBN PIVIB computer program for computing tracking performance effects of vibration. Applications to some current problems are demonstrated. Author

N82-30854*# Connecticut Univ., Storrs. Dept. of Electrical Engineering and Computer Science.

MODELING LATERAL ACCELERATION EFFECTS ON PILOT PERFORMANCE

Jonathan Korn and David L. Kleinmen *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 340-348 refs

Avail: NTIS HC A99/MF A01 CSCL 06S

Attendant to the direct side force maneuver of a vectored force fighter is the transverse acceleration imposed on the pilot. This lateral acceleration (G sub y), when combined with a positive G sub z stress, is a potential source of pilot tracking performance impairment. Experimental and analytical modeling of pilot performance decrements using the optimal control model (OCM) is described. J.D.

N82-30855*# Systems Technology, Inc., Hawthorne, Calif. **A COMPREHENSIVE SYSTEM MODEL FOR MOTION/SPACE SICKNESS: PRELIMINARY RESULTS**

Susan A. Riedel *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 349-368 refs

(Contract NAS2-10430)

Avail: NTIS HC A99/MF A01 CSCL 06P

The observed facts of motion/space sickness are categorized and ordered into a rational structure for use in a comprehensive system model for motion/space sickness. An array of key facts, consisting of a collection of motion/space sickness observations assembled from the current literature which must be accounted for in the comprehensive model, is presented. A model structure responsive to the array of key facts and to the other requirements of a working research tool is presented. J.D.

N82-30858*# Dayton Univ., Ohio. Dept. of Aerospace Engineering.

PILOT REACTION TO ATTITUDE GYRO FAILURE: A FLIGHT EXPERIMENT

Richard L. Newman and David L. Quam *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 410-421 refs

Avail: NTIS HC A99/MF A01 CSCL 05H

A flight experiment using a Cessna 172 airplane with the vacuum system modified to permit total failure of the attitude and directional gyros is described. Nine subject pilots, ranging in experience from 170 to 5100 hours, flew simulated (hooded) instrument missions with an unexpected gyro failure introduced at a critical point. All subjects, except for the 170 hour pilot, were instrument rated. (The 170 hour pilot was a private pilot working on his instrument rating). All of the subject pilots were able to maintain control of the airplane following the gyro failure. Only one subject exceeded the a priori criterion of losing a maximum of 250 feet of altitude. None of the subjects flew a satisfactory VOR approach following the failure; however, all would have found the airport safely given a ceiling of 1000 feet or better. J.D.

N82-30861*# Ohio State Univ., Columbus. Dept. of Industrial and Systems Engineering.

COMBINED DISCRETE NETWORK CONTINUOUS CONTROL MODELLING OF OPERATOR BEHAVIOR

R. A. Miller and Deborah J. Seifert (AiResearch Manufacturing Co.) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 448-464 refs

Avail: NTIS HC A99/MF A01 CSCL 05I

Systems in which an operator is faced with a continuous control task plus one or more discrete information processing

tasks were investigated. A modeling approach which has the capability of realistically representing both types of tasks and the resulting interactions is described. The modeling approach utilizes discrete network models for the cognitive tasks and elements of an open loop/closed loop control representation for the continuous task. The approach is demonstrated through its application to a simulated digital avionics information system in which subjects were required to perform retrieval and processing tasks as well as flight control. This model differs from conventional models in that system status sampling is not necessarily continuous or periodic. Rather, the pilot is assumed to read system status displays only as time permits and operate in open loop preprogrammed fashion between sampling. J.D.

N82-30862*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Industrial Engineering and Operations Research.

A MODEL OF HUMAN DECISION MAKING IN MULTIPLE PROCESS MONITORING SITUATIONS

Joel S. Greenstein and William B. Rouse (Illinois Univ., Urbana-Champaign) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 465-487 refs

(Grant NsG-2119)

Avail: NTIS HC A99/MF A01 CSCL 05J

Human decision making in multiple process monitoring situations is considered. It is proposed that human decision making in many multiple process monitoring situations can be modeled in terms of the human's detection of process related events and his allocation of attention among processes once he feels events have occurred. A mathematical model of human event detection and attention allocation performance in multiple process monitoring situations is developed. An assumption made in developing the model is that, in attempting to detect events, the human generates estimates of the probabilities that events have occurred. An elementary pattern recognition technique, discriminant analysis, is used to model the human's generation of these probability estimates. The performance of the model is compared to that of four subjects in a multiple process monitoring situation requiring allocation of attention among processes. Author

N82-30863*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

PROCRU: A MODEL FOR ANALYZING FLIGHT CREW PROCEDURES IN APPROACH TO LANDING

S. Baron, G. Zacharias, R. Muralidharan, and R. Lancraft *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 488-520 refs

(Contract NAS2-10035)

Avail: NTIS HC A99/MF A01 CSCL 05H

The Procedure Oriented Crew Model (PROCRU) simulation model for examining crew procedures in approach to landing is described and the results of its operation illustrated. It models cognitive and perceptual motor activities including monitoring and information processing, flight control, decision making, execution of standard procedures, and communications with other crew members and with air traffic control. A system model and a model for each crew member are included. The crew is composed of three members: pilot flying (PF), pilot not flying (PNF), and second officer (SO). The SO is modeled as a purely deterministic program that responds to events and generates requests. The PF and PNF are each represented by complex human operator models having information processing and decision making components. J.D.

N82-30864*# Systems Research Labs., Inc., Dayton, Ohio. **APPLICATION OF OPTIMAL CONTROL PRINCIPLES TO DESCRIBE THE SUPERVISORY CONTROL BEHAVIOR OF AAA CREW MEMBERS**

Chris Hale and George J. Valentino (Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, Ohio) *In* MIT Proc. of the 16th Ann. Conf. on Manual Control 1980 p 523-532

Avail: NTIS HC A99/MF A01 CSCL 05J

Supervisory decision making and control behavior within a C to the third power oriented, ground based weapon system was studied. The sequence of control strategies used during engagement of aircraft targets was empirically investigated. An engagement is conceptually divided into several stages which include initial information processing activity, tracking, and ongoing adaptive control decisions. Model parameters are described and two experiments which served as initial investigation into the

N82-30867

accuracy of assumptions on the importance of situation assessment in procedure selection are outlined. The validity of the assumptions on strategic information processing and cue criterion relationship learning is upheld. It is indicated that the model structure is useful in studies of supervisory decision behavior.

E.A.K.

N82-30867*# Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.

THE ROLE OF ANTAGONIST COACTIVATION IN THE CONTROL OF NATURAL MOVEMENT

Neville Hogan *In its Proc. of the 16th Ann. Conf. on Manual Control* 1980 p 571-583 refs

(Grant NSF PFR-79-17348)

Avail: NTIS HC A99/MF A01 CSCL 06P

The control of the impedance about the joints of the natural musculoskeletal system by coactivation of antagonist muscle groups is described. The consequences of the ability to control joint impedance are discussed. An explanation of the crucial role played by two joint muscles in the control of natural movement is proposed. The implications for the control manipulators and the modeling of the human operator are discussed. E.A.K.

N82-30868*# Massachusetts Inst. of Tech., Cambridge.

A COMPARISON OF CONTROL MODES FOR TIME-DELAYED REMOTE MANIPULATION

Gregory P. Starr *In its Proc. of the 16th Ann. Conf. on Manual Control* 1980 p 584-592 refs

Avail: NTIS HC A99/MF A01 CSCL 05H

Transmission time delay in the communication channel of a manual control system which degrades performance by preventing the human operator from immediately seeing the results of his actions is discussed. A time delay exists in remote manipulation systems, caused by long communication distances or bandwidth limitations. It is suggested that the because of the difficulty of effectively using the move and wait strategy with a master slave manipulator-rate control is a more effective control mode with time delay. Manipulator rate controllers are usually multiaxis joysticks or switchboxes and are constructed so that the manipulator can be held stationary. The hand is removed from the controller which eliminates the possibility of undesired manipulator motion and should aid in the use of the move and wait strategy. Master slave and rate control of a manipulator are compared. Four time delays are used. These delays allow the examination of the effect of time delay on control mode performance. A peg transfer task used, with automated dated acquisition. E.A.K.

N82-30869*# Jet Propulsion Lab., California Inst. of Tech., Pasadena. Robotics and Teleoperator Group.

EXPERIMENTAL EVALUATION OF THE CONCEPT OF SUPERVISORY MANIPULATION

T. L. Brooks and T. B. Sheridan (MIT) *In MIT Proc. of the 16th Ann. Conf. on Manual Control* 1980 p 593-606 refs

(Contracts NAS7-100; N00014-77-C-0256)

Avail: NTIS HC A99/MF A01 CSCL 05H

A computer controlled teleoperator system which is based on task referenced sensor aided control to study supervisory manipulation was developed. This SUPERMAN system, performs complicated tasks in real time by utilizing the operator for high level functions related to the unpredictable portions of a task, while the subordinate machine performs the more well defined subtasks under human supervision. Supervisory control schemes were compared with manual control under real time conditions. Six representative tasks were performed under simulated conditions using four forms of manual control, as well as supervisory control. The effectiveness and quality of control were evaluated on the basis of the time required to complete each portion of the task and the type and number of errors which occurred. It is found that supervisory control improves performance for all forms of manual control except force reflecting master-slave which is slightly faster than supervisory control, but more prone to errors. E.A.K.

N82-30870*# National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

EVALUATION OF SMART SENSOR DISPLAYS FOR MULTIDIMENSIONAL PRECISION CONTROL OF SPACE

SHUTTLE REMOTE MANIPULATOR

A. K. Bejczy, J. W. Brown (JPL, Calif. Inst. of Tech., Pasadena), and J. L. Lewis *In MIT Proc. of 16th Ann. Conf. on Manual Control* 1980 p 607-627 refs

(Contract NAS7-100)

Avail: NTIS HC A99/MF A01 CSCL 05H

An enhanced proximity sensor and display system was developed and tested on the full scale Space Shuttle remote manipulator. The sensor system, integrated with a four claw end effector, measures range error up to 6 inches, and pitch and yaw alignment errors within + or - 15 deg., and displays error data on both graphic and numeric displays. The errors are referenced to the end effector control axes through appropriate data processing by a microcomputer acting on the sensor data in real time. Methods to minimize terminal range and alignment errors by utilizing range, pitch and yaw error information from the sensor displays were investigated. The test runs aided by sensor displays are contrasted with test runs without sensor display aids. The enhanced sensor and display system, the test runs and results are described. It is indicated that the use of graphic/numeric displays of proximity sensor information improves precision control of grasp/capture range by more than a factor of two for both static and dynamic grapple conditions. E.A.K.

N82-30871*# National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF RESTRICTED MOBILITY ON THE COMPOSITION AND METABOLISM OF BLOOD LIPOPROTEIDS IN RABBITS

P. P. Chayalo and T. A. Kirlyenko Apr. 1982 13 p refs Transl. into ENGLISH from Ukr. Biokhim. Zh. (USSR), v. 52, no. 3, 1980 p 359-364 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76846; NAS 1.15:76846) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

The content of total cholesterol and triacylglycerols in the blood increases in rabbits, subjected to conditions of restricted mobility for a period of two months, because of the increase in the content in the composition of lipoproteids of very low and low density. After intravenous administration of lipoproteids of very low density, which contain H3 cholesterol, the slowing of their dissociation was observed with hypokinesia. The metabolism of lipoproteids of low and high density is also slowed under these conditions while the activity of lipoproteinlipase in the blood plasma decreases. S.L.

N82-30872*# National Aeronautics and Space Administration, Washington, D. C.

REGIONAL REDISTRIBUTIONS OF THE BLOOD IN BLOOD LOSS AND MECHANICAL TRAUMA AGAINST THE BACKGROUND OF VARIOUS FUNCTIONAL STATES OF THE BODY

O. A. Kovalev, V. K. Kulagin, and B. I. Krivoruchko Jun. 1982 15 p refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 4, 1979 p 27-34 Transl. by SCITRAN, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-76880; NAS 1.15:76880) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Loss of 20-40% of circulating blood volume in immobilized rats subjected to shock by Kennon's method with either short term fixation of controls or 7 day hypokinesia was investigated. Phases of shock caused by compression of soft tissues and of irreversible shock caused by Kennon's method are described. Regional and after 7 day hypokinesia were studied. Shifts in the relative content of blood in organs and tissues and their relation to pathophysiology resulting from blood loss or mechanical trauma are discussed. Regional redistributions of blood may be caused by various factors such as stress, excitation and hemostasis. Characteristic sequential stages of regional blood redistribution are noted during the progression of the physiological reaction to extreme external effects. E.A.K.

N82-30873*# National Aeronautics and Space Administration, Washington, D. C.

THE INTERACTION OF PURKINJE CELLS, CAPILLARIES AND GLIA IN THE CEREBELLAR CORTEX OF NORMAL

AND HYPOKINETIC CATS

R. P. Kotskovich Jun. 1982 13 p refs Transl. into ENGLISH from Biol. Nauk. (USSR), no. 3, 1981 p 50-54 Transl. by SCITRAN, Santa Barbara, Calif. (Contract NASW-3542)

(NASA-TM-76882; NAS 1.15:76882) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

The interaction of Purkinje cells, capillaries and gliocytes in the cerebral cortex of normal and hypokinetic cats was studied. It is demonstrated that prolonged hypokinesia does not cause significant changes in the structure of Purkinje cells. It is found that morphological changes in the capillaries take place, which leads to a reduction in the vascular microbasin in the nerve cells. E.A.K.

N82-30874*# National Aeronautics and Space Administration, Washington, D. C.

INFLUENCE OF HYPOKINESIA ON THE CONTENT OF ELECTROLYTES IN ANIMAL ORGANS

G. D. Reushkina, V. N. Reushkina, and N. P. Roslyakov May 1982 4 p Transl. into ENGLISH from Patol. Fiziol. eksp. Ter. (USSR), no. 2, Mar. - Apr. 1981 p 92 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASW-3541)

(NASA-TM-76899; NAS 1.15:76899) Avail: Issuing Activity CSCL 06C

In 60 day controlled tests of hypokinesia of 35 rabbits, significant reduction in potassium, sodium and chlorine concentration in the myocardium and hypothalamus and slight reductions in the adrenals were noted. Intravenous administration of strophanthidin had no effect. After 60 days of hypokinesia, no further change in electrolyte concentration in the hypothalamus was noted. Further reduction in sodium, but an increase in potassium in the adrenals, and a progressive reduction of potassium content in the myocardium were noted. Administration of strophanthidin caused no significant changes in electrolyte concentrations of the hypothalamus or adrenals, but it increased the sodium, chlorine and particularly potassium concentration of the myocardium. R.J.F.

N82-30875*# National Aeronautics and Space Administration, Washington, D. C.

BIOGENIC MONOAMINE CONTENT OF THE GANGLIA IN THE AUTONOMIC NERVOUS SYSTEM OF RABBITS DURING ACUTE EXPERIMENTAL EMOTIONAL STRESS

V. V. Portugalov, N. V. Petrova, S. I. Kashtanov, and B. N. Manukhin May 1982 13 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 5, Sep.-Oct. 1981 p 28-32 Original language document announced as A82-16817 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASW-3541)

(NASA-TM-76900; NAS 1.15:76900) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

During emotional stress the content of norepinephrine in the adrenals, stellate ganglion and sympathetic chain increases, it decreases, in the myocardium and in the superior cervical ganglion it could not be determined. It was found that the content of epinephrine decreases in all the structures. Catecholamine depletion in the superior cervical ganglion has the most damaging effect of emotional stress. Introduction of electrodes into the hypothalamic ventromedial nuclei of intact rabbits induces shifts in the content of biogenic amines (in all structures with the exception of the myocardium). These shifts are similar in character but less pronounced than those in emotional stress. E.A.K.

N82-30876*# National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF IMMOBILIZATION ON THE DEVELOPMENT OF EXPERIMENTAL ARTERIOSCLEROSIS IN RABBITS

G. P. Deryagina and T. A. Sintysna May 1982 10 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 5, Sep. - Oct. 1981 p 32-36 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASW-3541)

(NASA-TM-76901; NAS 1.15:76901) Avail: Issuing Activity CSCL 06C

The permeability of the aortic wall increased as a result of immobilization within one month in animals given their usual food. Morphological examination revealed lipoidosis of the intima of the aorta and cardiac coronary arteries in 50 percent of cases.

Preliminary immobilization of animals for one month with their subsequent maintenance on an atherogenic diet for five months increased the frequency of sharp and marked atherosclerotic changes in the aorta and coronaries as compared to that in animals kept only on an atherogenic diet for the same period. The changes in lipid metabolism and the blood coagulation system as a result of immobilization were less significant. Author

N82-30877*# National Aeronautics and Space Administration, Washington, D. C.

INFLUENCE OF STRESS ON THE BLOOD SYSTEM REACTION IN ADRENALECTOMIZED MICE

P. D. Gorizontov, M. I. Fedotova, and L. N. Yegorova May 1982 8 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 5, Sep. - Oct. 1981 p 36-39 Original language was announced as A82-16814 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASW-3541)

(NASA-TM-76902; NAS 1.15:76902) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

The role of adrenocortical hormones in the cardiovascular system reaction to stress was studied on adrenalectomized and sham operated F1 mice. It is noted that under stress in hypokorticism the number of lymphoid cells in peripheral blood does not increase and the number of cells in the thymus did not decrease. No increase in the number of hemopoietic stem cells in the bone marrow was noted. The cells diminished in the early phase of stress in both sham operated mice and adrenalectomized mice. It is found that in the spleen neutrophilic leucocytosis is not dependant on the level of adrenal hormones. E.A.K.

N82-30878*# National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF PROLONGED HYPOKINESIA ON RESISTANCE OF RESISTIVE VESSELS IN RATS

V. A. Saltykova Apr. 1982 8 p refs Transl. into ENGLISH from Kardiologiya (USSR), v. 20, no. 6, 1980 p 107-108 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Inst. of General Pathology and Pathological Physiology, Academy of Medical Sciences (USSR), Moscow (Contract NASW-3542)

(NASA-TM-76849; NAS 1.15:76849) Avail: NTIS HC A02/MF A01 CSCL 06C

Under the effect of prolonged hypokinesia, the perfusion pressure in resistive vessels, measured under conditions of deep anesthesia and complete denervation, increased by approximately the same degree as arterial pressure in non-anesthetized animals. The increase in arterial perfusion pressure and the resistance of resistive vessels in animals subjected to prolonged hypokinesia was accompanied by an increase in adrenoreactivity. During prolonged hypokinesia, partial obliteration of the vascular bed of the skeletal muscles plays a significant role in the observed increase in resistance of vessels of the extremities. The increase in adrenoreactivity of the vessels during hypokinesia may be realized as a partial case of an increase in the adrenoreactivity of structures whose innervation is disturbed. Author

N82-30879*# National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF MEBICAR ON ANIMALS UNDER EXTREME CONDITIONS

I. Ye. Zimakova, R. A. Kamburg, and S. V. Kirshin May 1982 8 p refs Transl. into ENGLISH from Farmakol. Toksikol. (USSR), v. 43, no. 4, Jul. - Aug. 1980 p 368-371 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASW-3541)

(NASA-TM-76851; NAS 1.15:76851) Avail: Issuing Activity CSCL 06C

Mebicar, a new original tranquilizer, exerts a protective action on some parameters of body function under the influence of extreme conditions (stress, hypoxia). The antihypoxic effect of the drug manifests itself within a wide range (100-1000 mg/kg), and compares favorably with the effect of sodium hydroxybutyrate. Mebicar does not affect the muscle tone, movement coordination, or working capacity of the animals. It is suggested that the normalizing action of mebicar as a tranquilizer and antihypoxic agent may be related to its involvement in metabolism. Author

N82-30880*# National Aeronautics and Space Administration, Washington, D. C.

REACTION OF THE BLOOD SYSTEM TO SINGLE AND DOUBLE EFFECT OF A STRESS AGENT

M. I. Fedotova and O. I. Belousova May 1982 8 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 6, Nov. - Dec. 1981 p 24-27 Original language document announced as A82-16814 Transl. by SCITRAN, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-76866; NAS 1.15:76866) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Transformation of reaction to immobilization repeated 6 and 14 days after the first immobilization was demonstrated. Neutrophilic leukocytosis and lymphopenia are maintained in the blood but are less marked. It is concluded that a long term phase of increased body resistance develops after 6 hours of immobilization. E.A.K.

N82-30881*# National Aeronautics and Space Administration, Washington, D. C.

ACTIVATION OF THE CEREBRAL GBA-ERGIC INHIBITING SYSTEM IN STRESS

V. I. Pavlova, V. V. Malyshov, and F. Z. Meerson May 1982 11 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 1, Jan. - Feb. 1981 p 26-30 Transl. by Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-76867; NAS 1.15:76867) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Activation of the adrenergic and pituitary adrenal system which under the effects of prolonged severe stress factors such as immobilization or pain, was investigated. It is shown that activation of the hypophysealadrenalin system in emotional pain stress in rats lasts 4 days after cessation of the stress effect and is attended regularly by activation of the GABA ergic inhibiting system. It is suggested that the GABA ergic inhibiting system is a nonspecific mechanism which is activated regularly when stress factors restricting the stress reaction act on the organism. E.A.K.

N82-30882*# National Aeronautics and Space Administration, Washington, D. C.

SPECIFICITY OF ULTRASTRUCTURAL CHANGES IN RAT CARDIOMYOCYTES AFTER LOCAL GAMMA-IRRADIATION AND HYPOKINESIA

V. S. Romanov and L. A. Bespalova May 1982 11 p refs Transl. into ENGLISH from Radiobiologiya (USSR), v. 21, no. 2, Mar.-Apr. 1981 p 238-242 Transl. by SCITRAN, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-76853; NAS 1.15:76853) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Analysis was made of the results of the electron-microscopic and morphometric studies of cardiomyocytes of 30 rats exposed to 516 mC/kg γ -radiation, and myocardium of 30 animals subjected to hypokinesia for 50 days. The morphometric method revealed the distinctions on ultrastructural rearrangements in nuclei and mitochondria of myocardium cells with each effect applied. Author

N82-30883*# National Aeronautics and Space Administration, Washington, D. C.

INDICES OF THE RAT CENTRAL NERVOUS SYSTEM METABOLISM DURING 36- AND 60-DAY HYPOKINESIA

L. M. Kurkina, A. N. Panov, D. A. Rashevskaya, N. L. Tubinskaya, and R. A. Tigranyan May 1982 9 p refs Transl. into ENGLISH from Fiz. Zh. SSSR im. I. M. Sechenova, (USSR), v. 66, no. 4, Apr. 1980 p 475-479 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by USSR Academy of Sciences, Leningrad

(Contract NASw-3541)

(NASA-TM-76870; NAS 1.15:76870) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Male Wistar rats were kept hypokinetic for 46, 53, or 60 days to reveal biochemical alterations in the CNS. Neuronal and glial cytoplasmic RNA concentrations, acetylcholinesterase and butyrylcholinesterase activities, total thiol group content, and free amino acids were determined in various CNS tissues. A marked suppression of RNA metabolism appeared in the spinal

cord, but RNA concentrations in the brain either did not change or increased slightly. There was a slight decrease of thiol group content in the brain. Amino acid determinations were inconclusive, but tended to show decreased amounts. The findings demonstrate that hypokinesia produces certain biochemical alterations, primarily suppression of activity, in certain regions of the CNS. Author

N82-30884*# National Aeronautics and Space Administration, Washington, D. C.

ROLE OF THE THYROID GLAND DURING ADAPTATION OF SKELETAL MUSCLES TO INCREASED MOTOR ACTIVITY

T. P. Seene, K. P. Alec, K. E. Tomson, and A. A. Viru May 1982 13 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 67, no. 2, Feb. 1981 p 299-305 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76871; NAS 1.15:76871) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Male Wistar rats were adrenalectomized or given MTU to produce thyroid deficits, then tested for physical performance during running and swimming. Quadriceps femoris muscle cells were tested for RNA and DNA content following sacrifice. It is found that thyroid hormone deficits reduce performance. Regular physical activity in intact animals leads to increased muscle mass and RNA content, while DNA and RNA content in muscle tissue is diminished in hypothyroid and adrenalectomized animals. E.A.K.

N82-30885*# National Aeronautics and Space Administration, Washington, D. C.

CATECHOLAMINES IN THE BLOOD PLASMA OF AUGUST AND WISTAR RATS DURING EMOTIONAL STRESS

R. Kvetnanskiy, T. I. Belova, Z. Oprshalova, I. Ponets, A. Lindra, and V. A. Dushkin May 1982 15 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 67, no. 4, Apr. 1981 p 516-523 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76872; NAS 1.15:76872) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Male August and Wistar rats were catheterized and immobilized to produce stress. Blood pressure and catecholamine concentrations were measured during and after immobilization to reveal differences in the two groups' responses. Arterial pressure varied in both strains, but soon returned to initial levels in the Wistar rats, showing these animals to have greater cardiovascular stability. Stable arterial pressure is associated with low initial plasma catecholamine levels and higher levels during stress and that adrenal medullary activity differs in the two strains. S.L.

N82-30886*# National Aeronautics and Space Administration, Washington, D. C.

CHANGES OF BLOOD PLASMA RENIN ACTIVITY IN AUGUST AND WISTAR RATS UNDER EMOTIONAL STRESS

R. Kvetnanskiy, T. I. Belova, A. Lindra, Z. Oprshalova, and V. A. Dushkin May 1982 8 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 67, no. 6, Jun. 1981 p 911-915 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76873; NAS 1.15:76873) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Adult male August and Wistar rats were catheterized, then immobilized for two hours in order to make a comparative study of the neurochemistry of the physiological function stabilization during emotional stress. Arterial pressure was measured and blood samples were taken to ascertain plasma renin and catecholamine levels. Plasma renin activity was somewhat higher in August than in Wistar rats, but the August rats had a greater variability in results. The highest renin activity was found in those animals with highest blood pressure and adrenalin levels. In most cases there was no link between renin activity changes and catecholamine levels. S.L.

N82-30887*# National Aeronautics and Space Administration, Washington, D. C.

GLUCOCORTICOID RECEPTORS AND METABOLIC DISTURBANCES IN THE (RAT) LIVER AND HEART DURING IMMOBILIZATION

A. I. Bobkov and V. P. Kislyakova May 1982 13 p refs
Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 67, no. 8, 1981 p 1258-1264 Original language document announced as A82-10750 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)

(NASA-TM-76874; NAS 1.15:76874) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Male rats were immobilized for 30 min to 2 days to define the compensated and decompensated phases of stress. Intracellular steroid receptor interactions in the liver and heart, glucocorticoid dependent enzyme synthesis, and some aspects of cell metabolism were studied. The compensated phase was characterized by reduction of glucocorticoid binding by cytoplasmic receptors in response to highdogeneous glucocorticoid levels, increased liver tissue tyrosine aminotransferase (TAT) activity, and high blood glucose and cholesterol levels. Prolonged stress led to the decompensated phase, characterized by lower blood and tissue endogeneous glucocorticoid levels, depleted cell glucose and cholesterol reserves, reduced protein content, increased blood and tissue urea, marked hyponatremia, and reduced liver cell TAT activity. S.L.

N82-30888* National Aeronautics and Space Administration, Washington, D. C.

DNA AND RNA SYNTHESIS IN ISOLATED NUCLEI OF RAT SKELETAL MUSCLES DURING HYPODYANAMIA

I. V. Fedorov, G. S. Komolova, and A. V. Chernyy May 1982 9 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR), v. 67, no. 10, Oct. 1981 p 1521-1524 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76875; NAS 1.15:76875) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Male Wistar rats were immobilized for 22 days to determine the effects on RNA synthesis rates in skeletal muscle cell nuclei. Nerve impulses from working muscles facilitate activation of transcription, either by stimulating RNA and DNA polymerase activities or by maintaining DNA template integrity. It was found that the RNA transcription was diminished 41.7% and DNA synthesis 37% in these animals. E.A.K.

N82-30889* National Aeronautics and Space Administration, Washington, D. C.

EMOTIONAL STRESS AS A FACTOR IN CARDIOVASCULAR DISTURBANCES

K. V. Sudakov Jun. 1982 18 p refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 9, Sep. 1981 p 10-18 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76910; NAS 1.15:76910) Avail: Issuing Activity CSCL 06C

Model experimental emotional stress of rabbits and rats in serious conflict situations resulted in cardiovascular disturbances including ischemia and myocardial infarction in some animals. Animals were found to resist, adapt or be predisposed to cardiovascular disturbances. Limbic and reticular structures of the brainstem were found to be involved in changes of cardiac activity and arterial pressure. Individual and genetic differences in predisposition and resistance to cardiovascular disturbance were found in different genetic lines of rats. Catecholamine distribution in brainstem structures of predisposed and resistant rats were determined. Stagnant emotional excitation was found in separate experiments in the hypothalamus and reticular formation of the mesencephalon, resulting in visceral disturbances. This is associated with changes in sensitivity of individual reticular formation neurons. Author

N82-30890* National Aeronautics and Space Administration, Washington, D. C.

GENETIC AND INDIVIDUAL DIFFERENCES IN CARDIOVASCULAR DISTURBANCES OF RATS DURING EXPERIMENTAL EMOTIONAL STRESS

K. V. Sudakov, V. A. Dushkin, and Ye. A. Yumatov Jun. 1982 17 p refs Transl. into ENGLISH from Vestn. Akad. Nauk SSSR (USSR), no. 12, Dec. 1981 p 32-39 Original language doc. was announced as A82-23278 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by USSR Acad. of Med. Sci., Moscow

(Contract NASw-3541)

(NASA-TM-76911; NAS 1.15:76911) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

The arterial pressure and heart rate of rats (Wistar, way, August, random bred) was continuously recorded in 30 hour and 8 week immobilization emotional stress. Characteristic patterns of arterial pressure and heart rate in 30 hour immobilization were found. Wistar rats had the highest resistance to stress and August rats the least. Criteria were developed to predict cardiovascular disturbances and death from the time variations of blood pressure and heart rate early in immobilization. Significant correlation was found between motor activity and individual and genetic resistance to emotional stress, based on which animals and groups of animals can be selected with known proportions of animals with different degrees of resistance and predisposition to emotional stress. Author

N82-30891* National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF IMMOBILIZATION STRESS ON DIACYL- AND PLASMALOGEN-DERIVATIVES OF PHOSPHOLIPIDS IN VARIOUS RAT ORGANS AND TISSUES

V. M. Dembinskiy and V. Ye. Ryabinin May 1982 9 p refs Transl. into ENGLISH from Vopr. Med. Khimii (USSR), v. 27, no. 5, Sep. - Oct. 1981 p 698-701 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Chelyabinsk Univ.

(Contract NASw-3541)

(NASA-TM-76852; NAS 1.15:76852) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

A quantitative distribution of plasmalogen and diacyl derivatives of different phospholipids was studied in various rat tissues during immobilization stress. The content of plasmalogens was decreased in various tissues, but the concentration of phosphatidyl acids, lysophosphatidyl choline and phosphatidyl glycerol was increased during the immobilization stress. S.L.

N82-30892* National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF SENSITIZATION ON DEVELOPMENT OF STRESS GASTRIC ULCERS IN RATS

Yu. S. Malov, A. R. Lapin, and G. P. Pluteshko May 1982 7 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 1, Jan. - Feb. 1981 p 30-33 Transl. by SCITRAN, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-76868; NAS 1.15:76868) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

The role of emotional stress in the development of gastric ulcers is evaluated. The experimental procedure employing rats as the test subjects is described. Stress factors may cause the development of the ulceration process in the human stomach.

S.L.

N82-30893* National Aeronautics and Space Administration, Washington, D. C.

SPECIFIC CYTOPLASMIC GLUCOCORTICOID RECEPTORS OF RAT LIVER UNDER CONDITIONS OF IMMOBILIZATION STRESS

P. P. Golikov, A. I. Bobkov, and A. S. Bobkova May 1982 9 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 6, Nov. - Dec. 1980 p 20-24 Transl. by SCITRAN, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-76863; NAS 1.15:76863) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

The binding of dexamethasone and corticosterone by specific cytoplasmic receptors of the liver was studied on intact and adrenalectomized animals and in those subjected to stress. The receptor hormone complex dissociation constants are calculated according to Scatchard. E.A.K.

N82-30894* National Aeronautics and Space Administration, Washington, D. C.

SPECIFIC CYTOPLASMIC GLUCOCORTICOID RECEPTORS OF THE RAT LIVER DURING IMMOBILIZATION STRESS

P. P. Golikov, A. I. Bobkov, and A. S. Bobkova May 1982 11 p refs Transl. into ENGLISH from Fiziol. Zh. SSSR (USSR),

N82-30895

v. 66, no. 3, 1980 p 416-421 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76869; NAS 1.15:76869) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06C

Adrenalectomized, intact, and stressed male Wistar rats were analyzed for dexamethasone and corticosterone binding by specific cytoplasmic receptors in the liver. Scatchard analysis provided dissociation constants for receptor hormone complexes. The number of binding sites diminished during stress. It is suggested that measures taken to combat the effects of stress cause increasing steroid receptor interactions in the liver, restoring adaptive enzyme induction, and normalizing metabolic processes.

E.A.K.

N82-30895# Army Mobility Equipment Research and Development Center, Fort Belvoir, Va.

INVESTIGATION OF BEHAVIORALLY MODIFIED RATS FOR USE IN EXPLOSIVES DETECTION SYSTEMS Fiscal Year Report, 1976 - 1981

Raymond V. Nolan Dec. 1981 197 p refs
(AD-A114632; MERADCOM-2343) Avail: NTIS
HC A09/MF A01 CSCL 19/1

Experiments were devised to improve the reliability and versatility of that class of detector systems currently known as in vivo biosensors. The target substance of interest in this research was the military explosive TNT. The research was designed to prove the validity of four theses: (1) Rats can detect TNT vapor via their olfactory function; (2) Trained rats will operantly signal the arrival of TNT vapor at their nares; (3) Rats may be trained en masse to function as biosensor detection systems; (4) The electroencephalogram (EEG) of trained rats contains specific signals uniquely related to their awareness of TNT vapor. Albino male rats were equipped with four chronic indwelling brain electrodes, three of which were electroencephalograph (EEG) pick-off electrodes juxtaposed to the dura mater, while the fourth lead was a stimulus electrode embedded in the medial forebrain bundle (MFB). Electrical brain stimulation (EBS) was applied to the MFB (which has been termed a pleasure center), as a conditioning stimulus during training and reinforcement sessions. Subjects were first conditioned by operant methods to associate the presence of TNT vapors with EBS and to signal awareness of the target substances by treadle pressing. The four theses postulated above were proven individually. It has thus been demonstrated that properly conditioned rats can, in fact, be utilized as sensory elements in bio-sensor explosives detection systems.

GRA

N82-30896# Larc Association, Tempe, Ariz.

BIOFOULING COUNTERMEASURE EVALUATIONS FOR OTEC HEAT EXCHANGERS

R. O. Lewis Jun. 1981 19 p refs
(Contract W-31-109-eng-38)
(DE82-003918; ANL/OTEC-BCM-020) Avail: NTIS
HC A02/MF A01

Several promising countermeasure methods for maintaining heat transfer efficiency in OTEC heat exchangers were evaluated. Heat transfer monitors were utilized to evaluate the effectiveness of several countermeasure methods for candidate OTEC heat exchanger tubing. Countermeasure methods evaluated included the use of abrasive slurries, Amertap sponge rubber balls (alone and in combination with continuous and intermittent chlorination), M.A.N. brush, surfactant/dispersant organic chemical cleaning and continuous and intermittent chlorination.

DOE

N82-30897# Harvard Univ., Cambridge, Mass. Div. of Applied Science.

COATINGS FOR THE PREVENTION OF MACROFOULING IN THE OTEC PROGRAM Final Report

Ralph Mitchell and Paul J. Boyle (Policy and Management Associates, Inc.) Jul. 1981 90 p refs
(Contract W-31-109-eng-38)
(DE82-003238; ANL/OTEC-BCM-021) Avail: NTIS
HC A05/MF A01

A survey was conducted of antifoulant coatings that are currently available for controlling macrofouling in the marine environment. An overview of macrofouling problems that can be expected in various phases of the OTEC program is presented. The various general types of coatings systems, methods, and construction materials that are presently available for the control of marine macrofouling are summarized. These include copper

coatings, organo-metallic coatings, low energy coatings, ablative coatings, antifouling fiber reinforced plastics, antifouling concrete, and electrochemical protection methods. The various available coating compositions and electrochemical methods of macrofouling prevention are described. Commercially available antifouling coatings are listed. A selected list of marine coatings manufacturers is also provided. A selected bibliography of references on marine macrofouling prevention is included.

DOE

N82-30898# Decision Focus, Inc., Palo Alto, Calif.

AN ANALYTIC FRAMEWORK FOR ALLOCATING R AND D RESOURCES AT GRI Annual Report, Sep. 1980 - Jun. 1981

Robert A. Marshalla, Dale M. Nesbitt, and Donna B. Oman Nov. 1981 296 p
(Contract GRI-5080-310-0326)

(PB82-168428; GRI-80/0092) Avail: NTIS
HC A13/MF A01 CSCL 05A

A comprehensive technique that eliminates the need for direct subjective estimates of market outcomes was developed. Engineering assessments of technical outcomes are inherently more reliable because they can be unambiguously defined. A comprehensive energy economy model to compute their market impacts on a consistent basis is used. The new technique avoids inconsistencies and explicitly takes into account all technical and economic uncertainties that may affect project areas. The new technique is fully compatible with the PAM and applies to efficient utilization as well as supply project areas.

GRA

N82-30899# Joint Publications Research Service, Arlington, Va.

USSR REPORT: LIFE SCIENCES. EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION, NO. 6

16 Jul. 1982 93 p refs Transl. into ENGLISH from various Russian articles
(JPRS-81300) Copyright. Avail: Issuing Activity

Nonionizing electromagnetic radiation and its biological and physiological effects on animals and humans was studied. The following topics are discussed: stimulating effects of exposure of rat sternum to variable magnetic fields on antibody production in the spleen; biological and therapeutic effects of magnetic fields; different nervous system reactions; systematic adaptation reactions; use of magnetobiological effects in neurosurgery; changes in peripheral circulation in limbs during bone regeneration; changes in transcapillary metabolism in chronic venous insufficiency of legs; chromatography of rat brain neurons and nucleic acids of muscles as related to localization of decimeter waves during exercise; heat distribution in tissues; low frequency effects on animals of different ages; meteorological radar as source of SHF electromagnetic field energy and problems of environmental hygiene; effects of microwave radiation and resistance to ionizing radiation; effects of single exposure to microwaves on quantity and functional properties of T and B lymphocytes; and cytogenetic and gonadotoxic effects of static electric fields. For individual titles, see N82-30900 through N82-30916.

N82-30900# Joint Publications Research Service, Arlington, Va.

STIMULATING EFFECT OF EXPOSURE OF RAT STERNUM TO VARIABLE MAGNETIC FIELD ON ANTIBODY PRODUCTION IN THE SPLEEN

O. F. Melnikov, A. A. Diyesperova, E. A. Bakay, and A. I. Rudy
In its USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 1-5 refs Transl. into ENGLISH from Fiziol. Zh. (Kiev), v. 28, no. 1, Jan. - Feb. 1982 p 109-112

Avail: Issuing Activity

The possibility of stimulating antibody production by exposing the sternum, at the projection of the thymus, to a variable frequency magnetic field was investigated. Agents capable of selectively altering functional activity of the immunogenetic system were studied. Physical factors along with biological agents are used, most often from thymus tissue and their synthetic analogues. It is demonstrated that exposure to variable electromagnetic fields could activate antibody genesis. Besides the entire lymphoid tissue system, other organs and systems are exposed to magnetic fields, which is not always desirable.

E.A.K.

N82-30901# Joint Publications Research Service, Arlington, Va.

STATUS AND PROSPECTS OF RESEARCH ON BIOLOGICAL AND THERAPEUTIC EFFECTS OF MAGNETIC FIELDS

V. M. Bogolyubov *In its USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 6-10* Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Kult. (Moscow), no. 4, Jul. - Aug. 1981

Avail: Issuing Activity

Biological effects of magnetic fields (MF) on physiological aspects and general questions in appreciation of this factor were examined. Therapeutic use of MF, magnetohygiene, magnetoecology, biomagnetism is discussed. Biotropic parameters of MF which refer to the physical characteristics of the field that determines the mechanisms of its interaction with biological systems, as well as biological effects was formed in magnetobiology. Intensity, gradient, vector frequency and shape of pulses, as well as duration of exposure are among the main biotrophic parameters of MF. E.A.K.

N82-30902# Joint Publications Research Service, Arlington, Va.

DISTINCTIONS OF NERVOUS SYSTEM REACTIONS TO ARTIFICIALLY INTENSIFIED MAGNETIC FIELDS

Yu. A. Kholodov *In its USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 11-15* refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 5-9

Avail: Issuing Activity

The reaction of the body systems to exogenous, intensified magnetic fields (MF) was studied. Body systems are ranked in the following order according to extent of involvement in reacting to total body exposure to MF: nervous, endocrine, sense organs, cardiovascular, blood, digestive, muscles, excretory, respiratory, integument and bone. The presence of both local changes and reactions by systems not directly exposed to local MF shows that regulatory system, nervous and endocrine, is involved in reactions to MF. The distinctions of some reactions of the nervous system to MF are discussed. E.A.K.

N82-30903# Joint Publications Research Service, Arlington, Va.

MECHANISM OF BIOLOGICAL EFFECTS OF MAGNETIC FIELDS

N. A. Udnitsev *In its USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 16-0* refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 9-12

Avail: Issuing Activity

Magnetic fields (MF) of different intensities and frequencies are used more extensively for treatment of diseases of the skeleto muscular system, vessels and gastrointestinal tract. The mechanism of biological effects of MF, like other physiotherapeutic factors, a systemic organization of functions were investigated. The state of the neuroendocrine system and metabolism after total body exposure of white rats to variable MF (VMF) with 20 mT induction and at a frequency of 50 Hz was studied. Data obtained during brief exposure to MF are presented. E.A.K.

N82-30904# Joint Publications Research Service, Arlington, Va.

FORMATION OF SYSTEMIC ADAPTATION REACTIONS IN STATIC MAGNETIC FIELDS

M. A. Shishlo, S. Kh. Kubli, and L. L. Shimkevich *In its USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 21-27* refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 12-18

Avail: Issuing Activity

The activation of compensatory and adaptive processes, as well as formation of systemic adaptive reactions which enhance resistance to deleterious environmental factors, during exposure to magnetic fields were examined. Animals were exposed daily to static magnetic field (SMF), with a large volume of tissues in the field interaction. An increase in dispersion of resistance without change in its mean level after two SMF treatments was observed. By the 8th to 9th da reliable increase in resistance decreased substantially. It is found that under the influence of many weeks of exposure to magnetic fields fluctuations of these parameters persist but their amplitude gradually disappears. E.A.K.

N82-30905# Joint Publications Research Service, Arlington, Va.

POSSIBLE USE OF MAGNETOBIOLOGICAL EFFECTS IN NEUROSURGERY

R. P. Kikut, M. E. Liyepa, G. A. Kruminya, S. R. Kikute, E. A. Vitolis, and D. L. Apshkalne *In its USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 28-33* refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 18-24

Avail: Issuing Activity

The use of magnetic fields (MF) in neurosurgery was studied. The possibility of using magnetobiological effects in the presence of neurovascular, neurooncological and inflammatory diseases of the central nervous system involving adhesive and glial processes was explored. The biological effects of MF are investigated and new methods of treating neurosurgical patients, which could supplement or replace existing surgical methods are developed. Data on the use of MF in neurosurgery and magnetic property of attracting ferromagnetic particles are provided. E.A.K.

N82-30906# Joint Publications Research Service, Arlington, Va.

CHANGES IN PERIPHERAL CIRCULATION OF LIMBS DURING BONE REGENERATION UNDER INFLUENCE OF LOW-FREQUENCY MAGNETIC FIELDS

I. M. Mitbreyt, G. I. Lavishcheva, and V. A. Dirin *In its USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 34-38* refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 24-27

Avail: Issuing Activity

Reparative regenerative processes in bone tissue are largely determined by the state of circulation in the injured limb segment. The role of peripheral circulation in the extremity in the mechanism of action of low frequency magnetic fields (MF), on reparative regeneration of bone was investigated. It is indicated that MF at a frequency of 50 Hz, an induction of 10 mT under both experimental and clinical conditions, has a marked effect on peripheral circulation in extremities and improve tissular trophics in the course of bone regeneration in fractures of the distal epimetaphysis of the radius. E.A.K.

N82-30907# Joint Publications Research Service, Arlington, Va.

CHANGES IN TRANSCAPILLARY METABOLISM IN PATIENTS WITH CHRONIC VENOUS INSUFFICIENCY OF LEGS UNDER INFLUENCE OF STATIC MAGNETIC FIELDS

B. N. Zhukov, L. A. Trufanov, and S. M. Musiyenko *In its USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 39-43* refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 28-31

Avail: Issuing Activity

Magnetotherapy in the treatment of peripheral vascular diseases was investigated. Experimental and clinical data are collected and indicated the beneficial effects of magnetic fields (MF) on some forms of vascular pathology. However, the mechanism of therapeutic action of MF, with indications and contraindications for its use have not yet been investigated sufficiently. Transcapillary metabolism and microcirculation in patients with chronic venous insufficiency of the legs were studied. Biophysical parameters which were monitored dynamically are presented. E.A.K.

N82-30908# Joint Publications Research Service, Arlington, Va.

CHROMATIN OF RAT BRAIN NEURONS AND NUCLEIC ACIDS OF MUSCLES AS RELATED TO LOCALIZATION OF DECIMETER WAVES DURING EXERCISE

Z. A. Sokolova *In its USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 44-47* refs Transl. into ENGLISH from Vopr. Kurortol., Fizioterapii i Lechebnoy Fiz. Kult. (Moscow), no. 4, Jul. - Aug. 1981 p 35-38

Avail: Issuing Activity

The effects of different localizations of DMW on structural and functional state of chromatin (deoxyribonucleoprotein--DNP) of cerebral neuronal nuclei and nucleic acid content of rat muscles during intensive physical exercise were studied. Experiments were conducted on 60 white male Wistar rats weighing 180 to 220 g. The physical load consisted of graded daily swimming in fresh water at a temperature of 28 to 32 deg for 4 weeks. DMW

N82-30909

were generated by a Volna 1 unit (emitter with 4 cm diameter, intensity of 120 mW/sq cm). The waves were delivered to the region of the femoral muscles, adrenals or head for 3 min/day to a total of 10 times. S.L.

N82-30909# Joint Publications Research Service, Arlington, Va.

DISTRIBUTION OF HEAT IN BIOLOGICAL TISSUES UNDER INFLUENCE OF UHF ELECTROMAGNETIC FIELDS

P. V. Svetitskiy *In its USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 48-53 refs Transl. into ENGLISH from Med. Biol. (Moscow), v. 27, no. 3, Mar. 1982 p 46-49*

Avail: Issuing Activity

The link between nature of distribution of generated heat in biological tissues and technical parameters is determined in order to control the biological effects of UHF EMF hyperthermia. The same intensity of exogenous EMF can elicit different levels of induced endogenous EMF, for which reason there is a change in heating of tissues. This phenomenon depends on the size and shape of biological objects, their orientation in relation to EMF vectors, morphological structures and electric properties of tissues, and intensity of energy emission by tissues as a result of vital functions. The distribution of heat in biological tissues exposed to UHF radiation was studied, in order to serve as a guide for clinical work. S.L.

N82-30910# Joint Publications Research Service, Arlington, Va.

EFFECTS OF LOW-FREQUENCY (50 Hz) ELECTRIC FIELDS ON ANIMALS OF DIFFERENT AGES

I. P. Kazaryan *In its USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 54-57 refs Transl. into ENGLISH from Gigiyan. Sanitariya (Moscow), no. 8, Aug. 1981 p 18-19*

Avail: Issuing Activity

The comparative sensitivity of young (growing) and old animals to 50 Hz electric fields was examined. The biological model consisted of 40 male white rats 1.5 to 2 months of age, weighing 90 to 100 g, and 1.5 to 2 years old, weighing 400 to 500 g, which were divided into 4 groups of 10 animals. The 1st group (young) and 3d (old) group served as a control, while the rats in the 2d and 4th groups were exposed daily to commercial frequency electric fields (CFEF) of 15 kV/m for 30 min a day, for 2 months. For this purpose, the animals were placed in special dielectric cages with simulated electric field of 50 Hz generated by means of high voltage tank [oil] transformers. The animals' condition was assessed on the basis of dynamics of body weight, static work capacity, summation threshold index, latency period of unconditioned reflex, duration of hexenal induced sleep, overall exchange of gases and blood cholinesterase activity. These parameters were determined before the experiment (background data) and every 2 weeks during exposure. S.L.

N82-30911# Joint Publications Research Service, Arlington, Va.

METEOROLOGICAL RADAR AS SOURCE OF SHF ELECTROMAGNETIC FIELD ENERGY AND PROBLEMS OF ENVIRONMENTAL HYGIENE

Yu. D. Dumanskiy, N. G. Nikitina, L. A. Tomashevskaya, F. R. Kholyavko, K. S. Zhupakhin, and V. a. Yurmanov *In its USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 58-63 refs Transl. into ENGLISH from Gigiyan. i Sanitariya (Moscow), no. 2, Feb. 1982 p 7-11*

Avail: Issuing Activity

The electromagnetic situation at locations of meteorological radar stations (MRS) and biological implications of electromagnetic fields generated by radar devices used for meteorological purposes was studied. The specifications of the MRS and their operating modes were determined, and the patterns of distribution of electromagnetic energy generated by MRS in the environment was established. A method was developed to measure electromagnetic fields in the superhigh frequency range using instruments and calculations. S.L.

N82-30912# Joint Publications Research Service, Arlington, Va.

EFFECTS OF MICROWAVE RADIATION ON MOUSE HEMOPOIETIC STEM CELLS AND ON ANIMAL RESISTANCE TO IONIZING RADIATION

D. Rotkovska, A. Vacek, and A. Bartonickova *In its USSR Rept.: Life Sci., No. 6 (JPRS-81200) 16 Jul. 1982 p 64-69 refs Transl. into ENGLISH from Radiobiol. (Moscow), v. 21, no. 4, Jul. - Aug. 1981 p 558-562 N82-30899 21-51*

Avail: Issuing Activity

The effects of microwave (MW) on hemopoiesis in mice are discussed. Stimulation of colony-forming capacity of bone marrow and the spleen was demonstrated after total body exposure of mice for 5 min at the parameters used. This MW effect was used to enhance mouse resistance to ionizing radiation. S.L.

N82-30913# Joint Publications Research Service, Arlington, Va.

EFFECT OF SINGLE EXPOSURE TO MICROWAVES ON QUANTITY AND FUNCTIONAL PROPERTIES OF T AND B LYMPHOCYTES OF GUINEA PIG AND MOUSE SPLEEN

I. A. Rudakov, S. F. Rudakova, I. V. Rizhinskaya, and O. S. Ogurtsova *In its USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 70-74 refs Transl. into ENGLISH from Radiobiol. (Moscow), v. 21, no. 4, Jul. - Aug. 1981 p 626-629*

Avail: Issuing Activity

Parameters of cellular immunity of animals at different intervals following single exposure to microwaves of thermal intensity were studied. The first series of experiments was performed with guinea pigs weighing 300 to 400 g, who were submitted to single total body exposure to microwaves in the reactive zone using a Luch 58 unit (frequency 2375 MHz, distance from emitting antenna horn 30 cm, output power 100 W, exposure 15 min). As a result of such exposure, the animals' body temperature rose by 4 to 4.5 C. Immediately after irradiation, as well as 1, 4, 7, and 21 days later, the animals were sacrificed; the spleen was excised under sterile conditions and a pooled suspension of spleen cells from 3 to 5 animals was obtained, which was then used to assess spontaneous and concanavalin A induced lymphocyte blast transformation by recording radioactivity of H3 thymidine incorporated in DNA. S.L.

N82-30914# Joint Publications Research Service, Arlington, Va.

MAIN DIRECTIONS OF SOVIET RESEARCH ON BIOLOGICAL EFFECTS OF MICROWAVE RADIATION

M. G. Shandala, M. I. Rudnev, Ye. F. Stoyan, and G. I. Vinogradov *In its USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 75-80 refs Transl. into ENGLISH from Gigiyan. i Sanitariya (Moscow), no. 10, Oct. 1981 p 4-7*

Avail: Issuing Activity

The effects of low intensity microwaves, ranging from 1 to 1000 microwatt/sq cm. Biological validation of standards on the basis of experimental research and studies of the health status of individuals residing in areas where this factor is present to some degree is considered to be the only correct approach to the problem of setting standards for microwave. Strict simulation of irradiation conditions in animal experiments enables the nature, degree, and main patterns of biological effects, including deleterious effect of the factor, as a function of its intensity, duration of exposure, wavelength and other variables to be determined. Special attention is given to the choice of tests characterizing the functional state of the organism. S.L.

N82-30915# Joint Publications Research Service, Arlington, Va.

CYTOGENETIC AND GONADOTOXIC EFFECTS OF STATIC ELECTRIC FIELDS

K. I. Stankevich, I. N. Badayeva, L. V. Samosh, and L. Z. Shumova *In its USSR Rept.: Life Sci., No. 6 (JPRS-81300) 16 Jul. 1982 p 81-84 refs Transl. into ENGLISH from Gigiyan. i Sanitariya (Moscow), no. 10, Oct. 1981 p 9-11*

Avail: Issuing Activity

The effects of static electric fields on morphological and genetic structures of testicular cells of white mongrel mice was studied. The effects according to incidence of cytogenetic disturbances in meiotic chromosomes at the diakinesis-metaphase I stage in male mice was evaluated; preparations of testes were submitted to histological analysis. Experiments were conducted on a device, which consists of a chamber for experimental animals, double plated electrodes, adjustable brackets, aerofranklinizer connected into the power line and a kilovoltmeter. Field intensity in the chambers was regulated with the aerofranklinizer switch and distance between electrodes, on the basis of $E = V/H$.

where E is field intensity, V is voltage on the kilovoltmeter scale and H is distance between electrodes. S.L.

N82-30916# Joint Publications Research Service, Arlington, Va.

EFFECTS OF SUPERHIGH FREQUENCY ELECTROMAGNETIC FIELDS ON ANIMALS OF DIFFERENT AGES

O. I. Shutenko, I. P. Kozyarin, and I. I. Shvayko *In its USSR Rept.: Life Sci., No. 6 (JPRS-81300)* 16 Jul. 1982 p 85-90 refs Transl. into ENGLISH from Gigiyan. i Sanitariya (Moscow), no. 10, Oct. 1981 p 35-38

Avail: Issuing Activity

Effects of superhigh frequency (SHF) electromagnetic fields (EMF) on young (growing) and mature animals were tested. The experimental model consisted of 90 male white rats initially weighing 70 to 80 and 160 to 200 g. which were divided into 6 groups of 15 animals in each, depending on intensity of the factor used. The animals of the first (young) and fourth (puberal) groups served as a control. The second, third (young) and fifth, sixth (mature) groups were exposed to an SHF field with energy flux density (EFD) of 10 and 100 microwatts/sq cm, respectively, for 2 h/day over a period of 10 weeks. We used the Luch-58 magnetron SHF generator, at working frequency of 2375 + or - 50 MHz (wavelength 12.6 cm) as the source of SHF radiation. The animals were irradiated in groups in the zone of the formed field in an ordinary room with cinder block walls (temperature 18 to 20 C, humidity 40 to 60%). We used a PO 1 instrument (Medik 1) for dosimetry. We measured EFD of the SHF field over the entire area of the room. The animal cages were placed in areas where the fields constituted 10 and 100 microwatts/sq cm. S.L.

N82-30917* National Aeronautics and Space Administration, Washington, D. C.

AERONAUTICAL ENGINEERING: A CONTINUING BIBLIOGRAPHY WITH INDEXES

May 1982 150 p (NASA-SP-7037(148); NAS 1.21:7037(148)) Avail: NTIS HC \$5.00 CSCL 06E

This bibliography lists 512 reports, articles and other documents introduced into the NASA scientific and technical information system in April 1982. E.A.K.

N82-30918# National Aeronautics and Space Administration, Washington, D. C.

EFFECT OF HYPOKINESIA ON SOME RED BLOOD INDICES AND THE CONDITION OF REGULATORY SYSTEMS

B. M. Fedorov, V. S. Nevstruyeva, and G. D. Reushkina May 1982 12 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 4, 1980 p 61-65 Transl. by SCITRAN, Santa Barbara, Calif. (Contract NASW-3542)

(NASA-TM-76752; NAS 1.15:76752) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06P

Hypokinesia induces a decrease in the catecholamine level in the hypothalamic, myocardial and adrenal tissues of rabbits and a decrease in the erythrocyte count and hemoglobin content. Two intravenous strophanthin injections given in different periods of hypokinesia lasting up to 12 to 60 days promote the normalization of the values of hormonal mediator metabolism; the red blood values are normalized only in the early periods of hypokinesia. R.J.F.

N82-30919# Technology, Inc., Houston, Tex. Life Sciences Div.

A GENERAL PURPOSE DATA ACQUISITION AND ANALYSIS SYSTEM FOR NYSTAGMUS AND RELATED DATA

William G. Crosier Feb. 1982 261 p (Contract NAS9-14880) (NASA-CR-167704; NAS 1.26:167704) Avail: NTIS HC A12/MF A01 CSCL 06P

A system for collecting and analyzing nystagmus and related data is described. The system uses commercially available equipment for performing caloric irrigation and rotating chair tests on human subjects in order to evaluate certain characteristics of the human vestibular system. Three programs and their associated subprograms which are used with a laboratory microcomputer to perform three primary tasks are discussed. These include: (1) control and collect data in real time from a nystagmus experiment, (2) analyze data from eye movements

and related signals in order to measure such variables as eye velocities, and (3) provide hard copy formatted reports for reduced test data. S.L.

N82-30920# Medical Research Council, Cambridge (England). Applied Psychology Unit.

COGNITIVE PERFORMANCE, SLEEP QUALITY AND MOOD DURING DEEP OXY-HELIUM DIVING

Vivien J. Lewis and Alan D. Baddeley Jan. 1981 32 p refs (RNP-1/81; BR79073) Avail: NTIS HC A03/MF A01

A series of simulated saturation oxyhelium dives, examining physiological and psychological changes in man in high pressure conditions were studied. A series of five dives are reported, lasting between 18 and 26 days, and reaching maximum depths of between 300 msw and 540 msw. Tests of cognitive functioning, including associative and short term memory, arithmetic ability, perceptual speed, spatial manipulation, grammatical reasoning and semantic processing, were administered to well practiced subjects prior to each dive, at maximum depth and again during decompression. Self report measures of sleep and mood questionnaires were administered for a period extending from one week before each dive commenced until at least one week after the dive was completed. S.L.

N82-30921# Royal Signals and Radar Establishment, Malvern (England).

MEDICAL THERMOGRAPHY WITH A PYROELECTRIC VIDICON CAMERA

D. E. Burgess Mar. 1981 17 p refs Original contains color illustrations

(RSRE-3365; BR79226) Avail: NTIS HC A02/MF A01

A pyroelectric vidicon camera for use in medical thermography is discussed. The equipment used and the results obtained are described. B.W.

N82-30922# National Aeronautics and Space Administration, Washington, D. C.

RNA ACCUMULATION IN THE BODY OF NEURONS AS AN INDICATOR OF THEIR FUNCTIONAL DEAFFERENTATION

V. A. Klenikova and L. D. Malinauskayte Apr. 1982 10 p refs Transl. into ENGLISH from Fiz. Zh. SSSR (USSR), v. 6, no. 3, 1980 p 339-343 Transl. by Kanner (Leo) Associates, Redwood City, Calif. (Contract NASW-3541)

(NASA-TM-76850) Avail: Issuing Activity CSCL 06P

Using two wave cytospectrophotometry in the ultraviolet and visible regions of the spectrum, it is shown that prolonged functional deafferentation, evoked by visual deprivation or induced hypokinesia, caused a pronounced accumulation of RNA in the visual neurons of the cerebral cortex and in the motor neurons of the spinal cord, respectively. A similar, although quantitatively less considerable, accumulation of RNA is noted with intensified stimulation of these neurons, whereas a combination of deafferentation and stimulation weakened, and in a number of cases completely eliminated, the accumulation of RNA evoked by deafferentation. The obtained data indicate that the accumulation of RNA in the body of neurons may serve as an indicator not so much of intensified, but, conversely, weakened sensory pulsation. In the latter case, the mechanism of this accumulation is associated with the weakening of utilization of RNA by the neurons. Author

N82-30923# National Aeronautics and Space Administration, Washington, D. C.

EFFICACY OF CIMETIDIN IN THE PREVENTION OF ULCER FORMATION IN THE STOMACH DURING IMMOBILIZATION STRESS

G. I. Dorofeyev, I. A. Litovskiy, L. K. Gavrovskaya, and V. T. Ivashkin May 1982 9 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 6, Nov. - Dec. 1980 p 24-27 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Dept. of Hospital Therapy, S. M. Kirov Military Medical Academy, Leningrad (Contract NASW-3542)

(NASA-TM-76864; NAS 1.15:76864) Avail: NTIS HC A02/MF A01 CSCL 06E

The effect of stress on the formation of ulcers in the mucous membrane of the stomach, the increase in cyclic adenosine monophosphate level in the gastric tissues, and parietal cell structure alteration. Use of cimetidine prevents these effects

Author

N82-30924*# National Aeronautics and Space Administration, Washington, D. C.

THE ROLE OF THE HYPOPHYSIS IN EARLY REACTION OF HEMOPOIETIC ORGANS TO STRESS

Yu. B. Deshevoy May 1982 9 p refs Transl. into ENGLISH from Patol. Fiziol. Eksp. Ter. (USSR), no. 2, Mar. - Apr. 1980 p 50-54 Transl. by Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-76865) Avail: Issuing Activity CSCL 06P

Rats are used in experiments to study the role of the hypophysis in the reaction of the hemopoietic organs during the early period of stress reactions. Results show that preliminary hypophysectomy prevents the reduction in the number of lymphoid cells in the thymus, but has no effect on the devastation of the spleen. S.L.

N82-30925*# National Aeronautics and Space Administration, Washington, D. C.

REACTION TO HYPOKINESIA AND HYPERKINESIA OF SOMATOCHROME NEURONS IN THE MOTOR ZONE OF THE CEREBRAL CORTEX IN RABBITS

L. A. Zaruba Jun. 1982 8 p refs Transl. into English from Vestn. Zool. (USSR), no. 3, 1979 p 61-63 Transl. by Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-76885; NAS 1.15:76885) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06P

A group of rabbits were subjected to limited mobility for 2-2.5 months, another group to daily moderate running exercise on a treadmill during 3, 5, 8 and 9 months with a 3rd group serving as control. Analysis of sections of the cerebral cortex motor zone revealed that a presence of impulses coming from peripheral receptors was necessary for a normal activity of nerve cells. The 2 months hypokinesia disturbed the metabolism of nerve cells. In the absence of peripheral stimulation the size of the cell body decreased due to water disturbance in the cell. By 2.5 months the animals adapted to hypokinesia and differences in volume of the neuron, its nucleus and RNA content in neurons became insignificant. Long-term flow of stimulation from the periphery resulted in increased protoplasm mass while the volume of the nerve cell nucleus increased comparatively less. Prolonged increase of nerve cell activity heightened the expenditure of RNA. In this case the RNA functioned as the energy source which was necessary for protein synthesis by the cell. Author

N82-30926*# National Aeronautics and Space Administration, Washington, D. C.

STATE OF THE ENDOCRINE GLANDS IN HYPODYNAMIA (A REVIEW OF THE LITERATURE)

V.I. Korkach May 1982 16 p refs Transl. into ENGLISH from Vrach. Delo (USSR), no. 2, Feb. 1981 p 11-16 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76906; NAS 1.15:76906) Avail: Issuing Activity CSCL 06B

The effect of hypodynamia on gland secretion in humans and animals was studied. The glands investigated included the thymus, thyroid, hypothalamus, and adrenal glands. S.L.

N82-30927*# National Aeronautics and Space Administration, Washington, D. C.

CONTROL OF MUSCLE ACTIVITY IN UNLOADED CONDITIONS

A. V. Kovalik May 1982 7 p refs Transl. into ENGLISH from Gig. Tr. Prof. Zabol. (USSR), no. 8, Aug. 1981 p 44-45 Original language document announced as A82-15712 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76883; NAS 1.15:76883) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 06P

The ability of human test subjects to voluntarily tense specific muscle groups was. It was shown that less tension is generated than in overcoming an external load and that muscles of the upper half of the body are generally more controllable and generate greater tension than those of the lower half of the body. It is also noted that voluntary muscle tension can be generated in any sequence of muscle groups and for at least 3 hours continuously. It is found that 2 weeks of training produces

greatly improved precision and selectivity on muscle tensing. E.A.K.

N82-30928# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.

PULMONARY FUNCTION MEASURES BEFORE AND AFTER EXPOSURE OF HUMAN SUBJECTS TO +G(z) AND +G(x) ACCELERATION LOADS

Edwin Hender 28 Sep. 1981 25 p refs

(ZR0000101)

(AD-A114652; NADC-81236-60) Avail: NTIS

HC A02/MF A01 CSCL 06/19

Baseline dynamic lung volume measurements were determined on four subjects seated upright or reclined, both with and without inflation of an anti-G suit (AGS). Additional measurements were made before and after exposing the subjects to double acceleration pulses using the NADC Dynamic Flight Simulator. During the acceleration exposures, the subjects were either seated upright or were reclined; they wore an inflated AGS and either did or did not perform the M-1 maneuver. Acceleration pulses lasted 20 or 40s, and ranged in magnitude from 3 to 7 G. The effects of body position, G-protective clothing, and acceleration exposure on pulmonary function measures derived from flow-volume loops are described. GRA

N82-30929# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

AIRCREW IONIZING DOSES FROM RADIOACTIVE DUST CLOUD GENERATED BY NUCLEAR BURST M.S. Thesis

Burl E. Hickman Mar. 1982 77 p refs

(AD-A115541; AFIT/GNE/PH/82M-9) Avail: NTIS

HC A05/MF A01 CSCL 06/18

This report will evaluate the threat of radioactive fallout to which aircrew members will be exposed when flying through a descending fallout cloud. A computer program is developed for calculating the ionizing dose rate of a radioactive dust cloud as a function of time, and also the dose that an aircrew receives when flying through the respective cloud. A cloud model that is patterned after the AFIT fallout smearing code was developed. A comparison is made between the activities at various altitudes from 305 meters to 9150 meters to provide information for possible re-direction of flight. The external ionizing dose to the aircrew is computed by the new code considering the cloud size, the aircraft's transit time through the cloud, and the ingestion rate of radioactive particles into the aircraft's cabin. Information is also provided to indicate the method by which doses can be computed from a cloud of multiple bursts. The results demonstrate that total dose to each aircrew member is approximately 8 rems after flying through a fallout cloud one hour after cloud stabilization of a 1 Mt burst, with the mission continuing for eight hours subsequent to the cloud transit. Author (GRA)

N82-30930# Naval Submarine Medical Research Lab., Groton, Conn.

POSITION PAPER: THE TOXIC EFFECTS OF CHRONIC EXPOSURE TO LOW LEVELS OF CARBON DIOXIDE Interim Report

19 Jan. 1982 46 p refs

(AD-A115053; NSMRL-973) Avail: NTIS HC A03/MF A01

CSCL 06/20

Numerous patrol studies have provided a sizable data base of levels of CO₂ exposure and health problems encountered by Naval nuclear submariners. Humans have been exposed to a variety of concentrations of CO₂ for chronic periods of time aboard submarines, as well as in laboratory environments. Mean data, PICO₂ = 10 torr and 40 days, collectively represent this wide variety of CO₂ exposures. Physiological responses to the CO₂ environment were repeatedly documented, but toxic effects were not apparent. Human exposure tests were safely conducted in atmospheres containing up to 5 torr CO₂, for up to 90 days. Such exposures are therefore considered safe at this time. Animal studies showed that chronic, low-level, CO₂ exposures caused changes of the bone content of CO₂, the bone content of calcium, the soft tissue content of calcium, and histological changes of the lung. These changes were found to be completely reversible upon discontinuance of the animal's exposure to CO₂. The extrapolation of the animal data to humans is a current problem in the advancement of our understanding of the effects of CO₂ on humans. GRA

N82-30931# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A CORTICALLY IMPLANTABLE MULTIELECTRODE ARRAY FOR INVESTIGATING THE MAMMALIAN VISUAL SYSTEM

M.S. Thesis

George W. German, III Dec. 1981 107 p refs
(AD-A115484: AFIT/GE/EE/81D-24) Avail: NTIS
HC A06/MF A01 CSCL 06/16

The research conducted during this study is a continuation of the Tatman-Fitzgerald (DTIC AD A080378, AD A100763) fabrication and testing of an implantable, multiplexed, multi-electrode array that will be used to record the bioelectric signals emitted from the visual cortex of a live, visually functional animal. Primary emphasis of this study is the investigation of passivation materials that can be used to protect the AFIT Multielectrode Array from the harsh cerebrospinal environment encountered inside the cranium. Secondary emphasis is placed on analyzing the electrical characteristics of an AFIT JFET, designing an improved multiplexing drive circuit, and testing the system equipment with an operational device. Author (GRA)

N82-30932# Los Alamos Scientific Lab., N. Mex.

BIOLOGICAL AVAILABILITY OF NICKEL ARSENIDES: TOXIC EFFECTS OF PARTICULATE Ni₅As₂

L. R. Gurley, R. A. Tobey, J. G. Valdez, M. S. Halleck, and S. S. Barham (Mayo Clinic, Rochester, Minn.) 1981 29 p refs Presented at the 21st Stanford Life Sci. Symp. on Biol. Availability of Trace Metals, Richland, Wash., 4-8 Oct. 1981 (Contract W-7405-eng-36)

(DE82-000580: LA-UR-81-2708: CONF-811035-1) Avail: NTIS HC A03/MF A01

The toxicity of nickel arsenides was studied to determine if fugitive nickel arsenides from an oil shale retort could pose a threat to personnel in the workplace or to other living organisms in the environment. Considerations of: oil shale retort operating conditions, oil shale elemental composition, nickel and arsenic physicochemical properties, and oil shale matrix structure suggest that nickel arsenides may be formed during the oil shale retorting process. Similarities between nickel subarsenide and nickel subsulfide and nickel subselenimide, both of which are known potent carcinogens, have caused concern that nickel arsenides may have adverse effects on biological systems. Five stable nickel arsenides and nickel arsenic sulfide are considered possible species for study. GRA

N82-30933# Wuerzburg Univ. (West Germany). Inst. fuer Toxikologie.

INVESTIGATION ON THE CARCINOGENIC EFFECT OF TRICHLORETHYLENE BY INHALATION AND MECHANISMS OF METABOLIC BIOACTIVATION Final Report, May 1980

Dietrich Henschler Bonn Bundesministerium fuer Forschung und Technologie Mar. 1982 22 p refs In GERMAN: ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie (BMFT-FB-HA-82-007: ISSN-0171-7618) Avail: NTIS HC A02/MF A01: Fachinformationszentrum, Karlsruhe, West Germany DM 4.60

Trichloroethylene, one of the most frequently used solvents, was studied as a carcinogen on account of the chemical relationship to vinylchloride. To test this, systematic inhalation experiments were performed on three animal species (mice, rats, hamsters) at 100 ppm and 500 ppm, 6 h/day, 5 days/week for 18 months. In parallel the biochemical level was measured, providing insight into the mechanism of action of the compound. Macroscopic and microscopic evaluation of all tissues of the experimental animals after spontaneous death reveals no increase in the rates of benign and malignant tumors in the exposed group above the controls. In female mice, there is a dose related increase in the rate of malignant lymphomas which is, however, believed to be a nonspecific activation of virus infestation. The results show that long-term inhalation of trichloroethylene, even in high concentrations, renders no indication of a carcinogenic risk. The results of this investigation stand against the worldwide suspicion that trichloroethylene, a very frequently used solvent in the work area as well as in household environments, presents a carcinogenic risk. Author (ESA)

N82-30934# Environmental Protection Agency, Washington, D.C. Office of Noise Abatement and Control.

DETAILED RESEARCH PLAN: CARDIOVASCULAR EFFECTS OF NOISE

Dec. 1981 83 p
(PB82-163379: EPA-550/9-81-104) Avail: NTIS
HC A05/MF A01 CSCL 06S

The effects of long term (acoustical) noise exposure on the cardiovascular system, the best documented of the nonauditory physiological effects of noise and the greatest potential public health issue are discussed. A plan was developed which includes the following items: (1) a summary of what is known from short term and long term studies; (2) detailed multicomponent plans for animal experimental studies, human epidemiologic studies, and human experimental studies; (3) discussion of recent research; and (4) analysis of five options. It is estimated that if research proceeds according to this plan, decision points will occur in year 3, year 6 and year 8. GRA

N82-30935# Joint Publications Research Service, Arlington, Va.

USSR REPORT. LIFE SCIENCES: BIOMEDICAL AND BEHAVIORAL SCIENCES, NO. 19

4 Aug. 1982 101 p refs Transl. into ENGLISH of various RUSSIAN articles (JPRS-81442) Avail: Issuing Activity

Numerous topics in the biomedical and behavioral sciences are discussed. Bionics, biotechnology, ecology, medical demography, physiology, and radiation biology are among the topics covered. For individual titles, see N82-30936 through N82-30938.

N82-30936# Joint Publications Research Service, Arlington, Va.

NEW ASPECTS OF FUNCTIONAL SYSTEM THEORY

K. V. Sudakov *In its USSR Rept. Life Sci.* (JPRS-81442) 4 Aug. 1982 p 59-73 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 2, Feb. 1982 p 3-13

Avail: Issuing Activity

The psychology of human motivation is discussed. A functional system theory is examined which states that living beings are inscribed in the exogenous time and space continuum which can be separated into discrete quanta, each of which is formed by some need of the organism and leads to satisfaction of those needs. R.J.F.

N82-30937# Joint Publications Research Service, Arlington, Va.

PLASTIC PROPERTIES OF MOTIVATION AS PRIME COMPONENT IN SYSTEMIC ORGANIZATION OF PURPOSE-FUL BEHAVIORAL ACTS

A. V. Kotov and V. G. Zilov *In its USSR Rept. Life Sci.* (JPRS-81442) 4 Aug. 1982 p 74-80 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 2, Feb. 1982 p 17-21

Avail: Issuing Activity

The nature of corticofugal influences on the formation in animals of food and defense motivations were studied. Inhibitory effects resulting from the stimulation of the frontal cortex were noted, as well as more complex influences resulting from the simulation of the occipital region of the neocortex, namely the inhibition of avoidance reactions and alleviation of food behavior. R.J.F.

N82-30938# Joint Publications Research Service, Arlington, Va.

SYSTEMIC MECHANISMS OF HUMAN SUBCONSCIOUS ACTIVITY

Ye. A. Umryukhim *In its USSR Rept. Life Sci.* (JPRS-81442) 4 Aug. 1982 p 81-90 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 2, Feb. 1982 p 88-95

Avail: Issuing Activity

A model of the systemic organization of the subconscious mechanisms of human behavior is given with emphasis upon man's intuitive learning. The experimental data which served as the basis of the analysis was obtained by means of a technique which made it possible to single out and examine the stages of human learning. R.J.F.

N82-30939# Naval Training Analysis and Evaluation Group, Orlando, Fla.

IMPROVED PROCEDURES TRAINING THROUGH USE OF AIDS DEVELOPED FROM LEARNING GUIDELINES

Paul G. Scott, William C. McDaniel, and Richard Braby Feb. 1982 29 p refs (AD-A113109: TAEG-TR-113) Avail: NTIS HC A03/MF A01 CSCL 05/9

N82-30940

This report describes the development of a procedural training aid for the SH-3 Aircraft Normal Start Checklist. The results of a comparative evaluation of the training aid with the traditional squadron materials used for procedures training are provided.

Author (IGRA)

N82-30940# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

PREDICTION OF SHORT TERM TRACKING TASKS USING AN OPTIMAL PILOT MODEL M.S. Thesis

Patrick A. Mullen Mar. 1982 101 p refs
(AD-A11543; AFIT/GAE/AA/81D-21) Avail: NTIS
HC A06/MF A01 CSCL 17/8

An optimal pilot model has previously been successful in predicting the long term tracking performance of a longitudinal air-to-air gunnery task. This study investigated modifications to the same pilot model to determine whether it could be used to successfully predict performance for a short term task. The same task, including a lead computing optical sight, was simulated on a hybrid computer. Three pilots flew three different aircraft configurations on the fixed-base simulator against a target driven to RMS accelerations of 3.5G and 5.0G by filtered, Gaussian noise. The target was at either 1000' or 3000' range. A comparison of the data generated by the human pilots versus that of the optimal pilot model showed moderate correlation for elevator deflection, lead angle and pitch rate. Overall, the optimal pilot model was less successful in predicting short term tracking performance than it was in predicting long term performance.

GRA

N82-30941# Naval Biodynamics Lab., New Orleans, La.
PERFORMANCE TESTS FOR REPEATED MEASURES: MORAN AND COMPUTER BATTERIES

Alvah C. Bittner, Jr., Robert C. Carter, and Michele Krause Nov. 1981 24 p refs
(AD-A115068; NBDL-81R012) Avail: NTIS
HC A02/MF A01 CSCL 05/10

This investigation was directed at statistical baseline evaluation of nine tasks for suitability for repeated measures applications to environmental investigations. In the first study, tasks from Moran and Mefford (1959) were administered to 18 subjects daily for 13 work days (Monday to Friday). In the second study, Carter and Sbisa (1981) computer battery tasks were administered daily to 17 subjects (12 in common with first study) for 15 work days. Examination of the means, variances, interday reliabilities and cross-task correlations led to the recommendation of four tasks for repeated measures applications Vertical Addition (Nv), Perceptual Speed (PS), Grammatical Reasoning (GR), and Flexibility of Closure (FC).

Author (GRA)

N82-30942# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

SPACE TELESCOPE NEUTRAL BUOYANCY SIMULATIONS: THE FIRST TWO YEARS

Fred G. Sanders Jun. 1982 126 p
(NASA-TM-82485; NAS 1.15:82485) Avail: NTIS
HC A07/MF A01 CSCL 05H

Neutral Buoyancy simulations which were conducted to validate the crew systems interface as it relates to space telescope on-orbit maintenance and contingency operations is discussed. The initial concept validation tests using low fidelity mockups is described. The entire spectrum of proposed space telescope refurbishment and selected contingencies using upgraded mockups which reflect flight hardware are reported. Findings which may be applicable to future efforts of a similar nature are presented.

E.A.K.

N82-30943# Martin Marietta Labs., Baltimore, Md.
ALGAL CULTURE STUDIES RELATED TO A CLOSED ECOLOGICAL LIFE SUPPORT SYSTEM (CELSS)

R. O. Radmer, O. Ollinger, A. Venables, and E. Fernandez Jul. 1982 37 p refs
(Contract NAS2-10969)
(NASA-CR-166375; NAS 1.26:166375) Avail: NTIS

HC A03/MF A01 CSCL 06K

Studies with algal cultures which relate to closed ecological life support systems (CELSS) are discussed. A description of a constant cell density apparatus for continuous culture of algae is included. Excretion of algal by-products, and nitrogen utilization and excretion are discussed.

Author

N82-30944# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

FMP STUDY OF PILOT WORKLOAD. QUALIFICATION OF WORKLOAD VIA INSTRUMENT SCAN

J: R. Tolte (Harvard Univ.), M. Vivaoudou, R. L. Harris, Sr., and A. Ephrath (Bell Labs., Piscataway) [1982] 6 p refs
(Contracts NCC1-23; NCC1-56)
(NASA-CR-169254; NAS 1.26:169254) Avail: NTIS
HC A02/MF A01 CSCL 05H

Various methods of measuring a pilot's mental workload are discussed. Scanning the various flight instruments with good scan pattern and other verbal tasks during instrument landings is given special attention for measuring pilot workload. L.F.M.

N82-30945# Human Resources Research Organization, Alexandria, Va.

HUMAN FACTORS AND ROBOTICS: CURRENT STATUS AND FUTURE PROSPECTS

H. McIlvaine Parsons and Greg P. Kearsley Oct. 1981 26 p refs
(Contract DAAD05-81-M-C790)
(AD-A115042; HUMRRO-PP-6-81) Avail: NTIS
HC A03/MF A01 CSCL 05/5

The purpose of this article is to introduce the human factors community to the field of robotics including current and future applications and needed areas of research. It also aims to explain to the robotics community why human factors engineering is important to this field.

N82-30946# Human Engineering Labs., Aberdeen Proving Ground, Md.

A COMPARISON OF DISPLAY FORMATS FOR THE ELECTRONIC MASTER MONITOR AND ADVISORY DISPLAY SYSTEM Final Report

Frank J. Malkin, Jon J. Fallesen, and Harry J. Reed Apr. 1982 31 p refs
(AD-A115127; HEL-TM-9-82) Avail: NTIS HC A03/MF A01 CSCL 14/2

A comparison of two sets of display formats for the Electronic Master Monitor and Advisory Display System (EMMADS) was conducted to determine the effect display format has on performance. Performance measures included accuracy of response and latency of response to a display of a fault, as well as error on a subsidiary tracking task. A subjective questionnaire was used to determine if pilot preferences exist for display format. The results indicated that there were no significant differences in any performance measure due to the display formats but that there was a significant difference in reaction time among the subsystems. The subsystem with only three alternative faults had a significantly lower reaction time than the two other subsystems with eight and ten alternatives each. Pilot preference tended to favor those formats which were simple, uncluttered, and which appeared to be least busy. GRA

N82-30947# Sandia Labs., Albuquerque, N. Mex.

OVERVIEW OF A PROCEDURE FOR HUMAN-RELIABILITY ANALYSIS

B. J. Bell and A. D. Swain 1981 10 p refs Presented at the ANS/EBS Top. Meeting on Probabilistic Risk Assessment, Port Chester, N. Y., 20 Sep. 1981
(Contract DE-AC04-76DP-00789)
(DEB1-030816; SAND-81-1961C; CONF-810905-6) Avail: NTIS HC A02/MF A01

An overview of the procedure used in performing a human reliability risk assessment and reliability analysis for nuclear power plant personnel is given.

DOE

N82-31887# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

WORKSHOP ON CLOSED SYSTEM ECOLOGY

15 Jul. 1982 19 p refs Workshop held in Pasadena, Calif., 18-22 Jan. 1982

(NASA-CR-169280; JPL-Pub-82-64; NAS 1.26:169280) Avail: NTIS HC A02/MF A01 CSCL 06C

Self maintaining laboratory scale ecological systems completely isolated from exchanges of matter with external systems were demonstrated. These research tools are discussed in terms of their anticipated value in understanding (1) global ecological material and energy balances, (2) the dynamics of stability and instability in ecosystems, (3) the effects of man-made substances and structures on ecosystems, and (4) the precise requirements for dynamic control of controlled ecology life support systems (CELSS). N.W.

N82-31888# Tufts Univ., Medford, Mass. Dept. of Physics. **DIFFUSION MEDIATED LOCALIZATION ON MEMBRANE SURFACES**

David L. Weaver Aug. 1982 26 p refs (Contract NCA2-OR785-201)

(NASA-CR-166386; NAS 1.26:166386) Avail: NTIS HC A03/MF A01 CSCL 07D

Using the model of a cell membrane of a spherical surface in which membrane components may diffuse, the rate of localization due to trapping under diffusion control has been estimated by computing an analytical expression for the mean trapping time including the possibilities of a trapping probability less than one and/or the establishment of an equilibrium at the trap boundary.

Author

N82-31889# Istituto Superiore di Sanita, Rome (Italy). Lab. delle Radiazioni.

ELECTRON PARAMAGNETIC RESONANCE ASSIGNMENT: AN ANALYSIS OF METHODS USED FOR BIOLOGICAL SAMPLES [ANALISI DELLE METHODICHE PER MISURE DI EPR SU CAMPIONI BIOLOGICI]

F. Ianzini and A. Rosi Mar. 1982 25 p refs In ITALIAN; ENGLISH summary

(ISS-T-82/2; ISSN-0390-6485) Avail: NTIS HC A02/MF A01

Sample conditioning methods for freeze-drying, homogenization and freezing, used for the electron paramagnetic resonance assessment of biological molecular activity in cells, tissues and fluids are described. The procedure based on 77 K freezing is found to be the most suitable for fluids and tissues analysis.

Author (ESA)

N82-31890# Research Inst. of National Defence, Stockholm (Sweden). Inst. of Aviation Medecine.

A TECHNIQUE FOR LONG-TERM MEASUREMENTS OF THYROID FUNCTION IN BEAGLE DOGS USING IODINE 125

Ove Wilson, John M. Stone (California Univ., Davis), and D. Edwin Monty (Arizona Univ., Tucson) Dec. 1979 39 p refs Sponsored by Swedish Medical Research Council (FOA-A-59003-H3) Avail: NTIS HC A03/MF A01

A procedure for measuring thyroid uptake and retention of I 125 is described. After a single dose of 1.85 MBq the thyroid retention curve can be followed for 3 to 6 months or more. Physiologic changes and experimental manipulations of thyroid function are observed by changes in the slope of the release curve. The form of the slope of the curve is useful for determining biological half life, evaluating changes in turnover, calculating release rate exponentials, and for analyzing iodine compartmental distribution. Backscatter and attenuation affect measurements of I 125 uptake more than measurements made with I 131. The major disadvantage of I 125 is the extent of its absorption in tissues, which is partially counterbalanced by backscatter from the tissues surrounding the thyroid. Backscatter in the Lucite neck phantom can exceed attenuation.

Author (ESA)

N82-31891# Societe Nationale Industrielle Aerospatiale, Les Mureaux (France). Lab. Central.

BIOCORROSION [BIOCORROSION]

G. Dalleagne 1982 14 p refs In FRENCH Presented at Ecole Natl. Super. de Chim. Ecole d'Ete sur Corrosion et Protection des Metaux, Les Houches, France, Sep. - Oct. 1981 (SNIAS-821-551-105; DCQ/L-160.390/82) Avail: NTIS HC A02/MF A01

Microorganisms which cause biocorrosion, factors which favor their development, and detection and treatment of biocorrosion are discussed. It is impossible to eradicate traces of water, in which the organisms develop, from contaminating fuel tanks, so fuel should be kept as free of water as possible. Synthetic liners which inhibit organism growth, and which are chemically resistant to water and jet fuel are suggested. It is possible that potassium bichromate, and boron compounds are good fungicides and bactericides.

Author (ESA)

N82-31892# Joint Publications Research Service, Arlington, Va. **USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 16, NO. 4, JULY - AUGUST 1982**

20 Aug. 1982 162 p refs Transl. into ENGLISH of Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 97 p (JPRS-81599) Copyright. Avail: Issuing Activity

Biological and medical tests conducted on animals and humans during and after manned spaceflights are reported. The following topics are discussed: psychological and physiological effects and changes, hemodynamic responses, nervous system and sensorimotor performance, neurological tests, cardiovascular system tests, biochemistry, developments in medical technology, and biological and physiological stress tests. For individual titles, see N82-31893 through N82-31921.

N82-31893# Joint Publications Research Service, Arlington, Va. **MAIN DIRECTIONS AND PRINCIPLES OF PSYCHOLOGICAL EXPERTISE OF COSMONAUTS**

K. K. Ioseliani, A. L. Narinskaya, and Sh. R. Khisambeyev *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599)* 20 Aug. 1982 p 1-8 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 4-8

Avail: Issuing Activity

Personality and psychological stability tests, used in the decision making of cosmonaut selection and the successful completion of their training are discussed. High demands are made on individual psychological, personality and professional qualities of cosmonauts to assure the reliability of the cosmonaut spacecraft system. The battery of psychological tests at the screening stage, routine and special certification and special training, aimed at selecting individuals whose psychological traits and personality make them eligible for professional work with specific space equipment, are outlined.

E.A.K.

N82-31894# Joint Publications Research Service, Arlington, Va. **ANESTHESIA, SURGERY AND RESUSCITATION DURING MANNED SPACEFLIGHTS**

L. L. Stazhadze, I. B. Goncharov, I. P. Neumyakin, V. V. Pogomolov, and I. V. Vladimirov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599)* 20 Aug. 1982 p 9-13 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 9-12

Avail: Issuing Activity

Technical problems of spacecraft environments and the changes in the human body and how they effect medical aid aboard a manned spaceflight are discussed. In space flight anesthesia can be applied using methods as multicomponent balanced anesthesia and peridural anesthesia. Surgery and resuscitation can be performed, by procedures and methods that allow operations in an abacterial environment, correction of vital dysfunctions with the aid of artificial pulmonary ventilation, cardiac electrotherapy, and sorptive purification of body fluids. Various aspects of infusion treatment and first medical aid are discussed.

E.A.K.

N82-31895# Joint Publications Research Service, Arlington, Va.
REGIONAL HEMODYNAMIC CHANGES AFTER SPACEFLIGHTS LASTING UP TO EIGHT DAYS

T. D. Vasilyeva, Kh. Kh. Yarullin, and V. I. Zhuyko *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 14-20 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 12-17*

Avail: Issuing Activity

Fourteen cosmonauts were exposed to rheographic examination before and after space missions, to measure the pulse blood filling, tone and elasticity of cerebral vessels, right lung and right leg vessels during tilt tests. Postflight examinations demonstrated distinct changes in the cerebral, pulmonary and peripheral circulation, indicating cardiovascular deconditioning. The greatest changes were seen in the tone of arteries, arterioles and veins of the brain hemispheres, vertebrobasilar system and the leg. The changes were reversible, requiring no special correction. The changes in different vascular compartments returned to normal in a nonuniform manner.

E.A.K.

N82-31896# Joint Publications Research Service, Arlington, Va.
EFFECT OF OPTOKINETIC STIMULATION ON OPERATOR'S FUNCTIONAL STATE AND PROFESSIONAL WORK CAPACITY

L. N. Kornilova, S. L. Kravchenko, L. D. Smirchevskiy, and A. A. Belonogov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 21-25 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 17-20*

Avail: Issuing Activity

The effects of optokinetic noise on the physiological and professional parameters of a trained operator was examined. The pattern and level of changes in the parameters depend on the initial sensitivity to optokinetic stimulation. It is shown that the optokinetic stimulus, which leads to operator activity impairment, especially in spatial orientation is significant to the impaired orderlines of analyzer function, and its prolonged presence in subjects who are optokinetically unstable causes motion sickness symptoms.

E.A.K.

N82-31897# Joint Publications Research Service, Arlington, Va.
DEHYDRATION THERAPY FOR SUBJECTS EXPOSED TO SIMULATED SPACEFLIGHT CONDITIONS

L. L. Stazhadze, T. M. Demidova, Zh. M. Kudryashova, and L. G. Repenkova *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-82599) 20 Aug. 1982 p 26-32 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 20-24*

Avail: Issuing Activity

The effect of intravenous injection of 20% mannitol in a dose of 1 g per kg body weight at a rate of 5 ml/min on the central circulation and cardiac contractile function was investigated. The infusions were performed on 18 healthy male volunteers, who participated in a head down tilt test, during the control period, on days 3, 7 and 14 of bed rest, and during the recovery. It was found that prolonged osmotherapy produced a clinically distinct dehydration effect without influencing central circulation, led to positive cardiodynamics, and an improvement of left ventricle contractile function.

E.A.K.

N82-31900# Joint Publications Research Service, Arlington, Va.
DYNAMICS OF FUNCTIONAL STATE OF HEAVY TRANSPORT HELICOPTER PILOTS IN THE COURSE OF FLIGHT SHIFT

Yu. N. Kamenskiy *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 42-45 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 30-32*

Avail: Issuing Activity

Before and after flights about 300 crewmembers of heavy transport helicopters were examined, using psychophysiological and integral methods. During a flight shift the health state of helicopter pilots varies via three stages: habituation, initial decline, and distinct lassitude, with the latter developing after a five hour flight load. In order to increase human reliability in the pilot-helicopter system, it is advisable to allow four hours flight time during a flight shift onboard helicopters of the above type. In this case the pilot exposure to vibration effects will also be limited. The paper describes a maximally permissible spectrum of vibration velocity for a four hour exposure.

Author

N82-31901# Joint Publications Research Service, Arlington, Va.
CONTROGRAPHY USED FOR INTEGRAL ASSESSMENT OF MENTAL WORK CAPACITY

K. K. Ioseliani, A. L. Narinskaya, and Sh. R. Khisambeev *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 46-49 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 32-35*

Avail: Issuing Activity

Human mental performance was evaluated with the aid of a contrograph. Three groups with a high, medium, and low level of mental performance were detected. It was found that the method of contrography can be used to predict human capacity to perform complex operational functions. An integrated evaluation of mental performance by means of the contrographic technique was in good agreement with the results obtained by the traditional methods.

Author

N82-31902# Joint Publications Research Service, Arlington, Va.
SEISMOCARDIOGRAPHIC EVALUATION OF CONTRACTILE FUNCTION OF THE MYOCARDIUM OF HYPOKINETIC RATS

V. I. Kuznetsov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 50-55 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 35-38*

Avail: Issuing Activity

Seismocardiograph (SCG) recording in rats was explored and SCG time and amplitude parameters were determined. The measurements were performed on normal rats and hypokinetic rats with an altered cardiac contractility. The SCG data obtained in hypokinetic rats were compared with the results derived from contractility studies by heart catheterization and subsequent calculation of contraction strength and velocity. It is shown that the data compared are similar on hypokinetic days one and five. This suggests that the seismocardiographic method of studying heart contractility function of rats is adequate for integral evaluations of the strength and velocity of cardiac contractions in chronic experiments. On hypokinetic days fifteen and thirty the data obtained by catheterization and seismocardiographically are at variance. This is attributed to muscle mass losses and variations in the rigidity of 'internal' bonding.

Author

N82-31903# Joint Publications Research Service, Arlington, Va.
MORPHOLOGY AND COAGULANT FUNCTION OF HUMAN BLOOD SYSTEM DURING LONG EXPOSURE TO LOW AMMONIA CONCENTRATIONS IN A SEALED ENVIRONMENT

M. P. Kalandarova and L. S. Pochukayeva *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 56-59 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 39-41*

Avail: Issuing Activity

A group of test subjects was kept in a chamber in which the ammonia concentrations 5.1 + or - 0.05 mg/cu m and 2.1 + or - 0.1 mg/cu m were maintained for 17 and 31 days, respectively; on days 22 and 38 the ammonia concentration was increased to 9.3 + or - 0.1 mg/cu m. During this exposure the morphological composition (red blood cells, hemoglobin, reticulocytes, platelets,

white blood cells and their various types), as well as the coagulative-anticoagulative system (factor 4 of platelets, index of blood clot retraction, recalcification time, thrombin time, ethanol and protamine sulphate paracoagulation test, fibrinogen degradation products, fibrinolytic activity, and fibrinogen and prothrombin content) were investigated. The parameters characterizing hemopoiesis and status of the coagulative-anticoagulative system did not show any significant changes. However, a slight decrease in the counts of leukocytes, neutrophils, and eosinophils is of concern, because in space flight resistance to different infections declines. Author

N82-31904# Joint Publications Research Service, Arlington, Va.
PERCUTANEOUS MEASUREMENT OF PARTIAL OXYGEN TENSION AND LOCAL BLOOD FLOW IN MAN DURING ORTHOSTATIC TEST

O. Ye. Ozerova and Asyamolova *In its USSR Rept: Space Biol. and Aerospace Med.*, Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 60-64 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 41-44

Avail: Issuing Activity

Using a Drager oximeter modified by a Clark polarographic electrode, transdermal measurements of partial pressure of oxygen ($p_{\text{sub td}} \text{O}_2$) and local blood flow (Q) were carried out in 46 test subjects during tilt test (20 min). As a result of blood redistribution, at minute 1 Q increased significantly in the lower body ($p < 0.01$) and decreased in the upper body ($p < 0.01$). Regardless of the sensor location, $p_{\text{sub td}} \text{O}_2$ increased in most cases. M.G.

N82-31905# Joint Publications Research Service, Arlington, Va.
ACTIVITY OF RAT ADRENAL MEDULA AFTER FLIGHT ABOARD COSMOS-1129 BIOSATELLITE

R. A. Kvetnansky *In its USSR Rept: Space Biol. and Aerospace Med.*, Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 65-69 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 44-47

Avail: Issuing Activity

After a 18.5-day space flight on Cosmos-1129 rat adrenals were investigated for the concentration of catecholamines and activity of enzymes involved in their synthesis, i.e., tyrosine hydroxylase, dopamine-beta-hydroxylase, and phenyl ethanol amine-N-methyl transferase. It was found that inflight the sympathoadreno-medullary system of rats was not exposed to a prolonged or strong stressogenic effect. Post-flight the rats showed an increased reactivity to the immobilization stress. Author

N82-31906# Joint Publications Research Service, Arlington, Va.
STEREORELOGICAL ANALYSIS OF RAT BONE TISSUE AFTER FLIGHT ABOARD COSMOS-1129 BIOSATELLITE

A. A. Prokhorchukov and V. S. Peschanskiy *In its USSR Rept: Space Biol. and Aerospace Med.*, Vol. 16, No. 4 Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 70-73 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 47-49

Avail: Issuing Activity

Stereological measurements of volume fractions of 53 samples of compact and spongy structures of bones of 15 rats were carried out. The measurements were performed on cortical lamellae, trabecules and lacunae, channels of osteons, and matrices of femoral, tibial and fibular bones of rats. Postflight no significant changes were seen in the above parameters as compared to the vivarium controls. During readaptation to 1 g a slight increase in the volume fraction of spongy bones was noted. M.G.

N82-31907# Joint Publications Research Service, Arlington, Va.
CHANGES IN RAT TISSUE DEOXYRIBONUCLEOPROTEIN AND NUCLEIC ACIDS FOLLOWING FLIGHT ABOARD COSMOS-1129 BIOSATELLITE

E. Misurova, R. A. Tigranyan, T. Sabova, and M. Praslicka *In its USSR Rept: Space Biol. and Aerospace Med.*, Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 74-78 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow),

v. 16, no. 4, Jul. - Aug. 1982 p 49-52

Avail: Issuing Activity

The concentration of polydeoxyribonucleotides and nucleic acids was measured in the spleen, thymus, liver, bone marrow and blood of rats flown for 18.5 days on Cosmos-1129. The exposure led to an increase in the polydeoxyribonucleotide content in the thymus and a decrease of the DNA and RNA concentration in the spleen and thymus. These changes returned to normal at R+6. Author

N82-31908# Joint Publications Research Service, Arlington, Va.
MORPHOLOGICAL DISTINCTIONS OF MACACA RHESUS MONKEY THYROID UNDER NORMAL AND VARIOUS TYPES OF HYPOKINETIC CONDITIONS

G. I. Plakuta-Plakutina, Ye. A. Savina, G. S. Belkaniya, D. S. Tavadyan, N. P. Dmitriyeva, Ye. A. Amirkhanyan, and R. S. Smirnova *In its USSR Rept: Space Biol. and Aerospace Med.*, Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 79-87 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 52-58.

Avail: Issuing Activity

Thyroid glands and C cells of Macaca rhesus were examined histologically, electron microscopically, and morphometrically. The examinations were performed on six intact and seven hypokinetic rhesus monkeys which were kept in a suspension device for two months, small cages for two months or in a head-down position (seven days in a horizontal position and then eleven days in a head-down position at -6 deg). The experiment with a diminished motor activity and a normal support function of the lower limbs (maintenance in small cages), in spite of its long duration, produced no structural changes in the parenchyma or C cells. The 18-day bed rest test was followed by a hypofunction of the thyroid gland, inhibition of hormonal synthesis, and secretion without distinct changes in C cells. Unlike previous experiments, the suspension study led to hyperplasia and hypertrophy of C cells and increase of their nuclear volume. Activation of C cells can be regarded as an adaptive reaction aimed at stabilizing bone calcium. M.G.

N82-31909# Joint Publications Research Service, Arlington, Va.
EFFECTS OF +G SUB X ACCELERATION AND ADEUTRON ON NUCLEI ACID CONTENT AND OTHER PARAMETERS OF MOUSE PERIPHERAL BLOOD

M. I. Minkova, I. T. Nikolov, Ye. R. Datsov, T. P. Pantev, and V. B. Tenchova *In its USSR Rept: Space Biol. and Aerospace Med.*, Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 88-92 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 58-60

Avail: Issuing Activity

The effect of acceleration and adeturon, a radioprotector, on the content of nucleic acids and the count, composition and osmotic resistance of white and red blood cells was investigated. Male mice of the H strain were exposed to +20G sub x for 5 min. The above parameters were measured 1, 24, and 48 hours after the exposure. The nuclei acid content decreased significantly immediately after the exposure and tended to return to normal afterwards. The leucocyte count was increased during all observation periods, and the erythrocyte count was decreased 1 hour after the exposure. Osmotic resistance of white and red blood cells varied in a different manner after the exposure. Adeturon administered at optimal protective doses (300 mg/kg) modified regulatory mechanisms of the animal body. M.G.

N82-31910# Joint Publications Research Service, Arlington, Va.
SIGNIFICANCE OF MAGNETIC FIELD PARAMETERS TO CHANGE IN EVOKED BIOELECTRIC ACTIVITY OF THE BRAIN

N. P. Smirnova, L. D. Klimovskaya, and A. S. Dyakonov *In its USSR Rept: Space Biol. and Aerospace Med.*, Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 93-97 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 61-63

Avail: Issuing Activity

The effect of a constant uniform magnetic field of 0.1 to 1.6 T on the somatosensory potentials of the brain cortex and hypothalamus was investigated on nembutal anesthetized rats. The exposure increased the amplitude and modified the form of evoked potentials in both brain structures. The effect grew significantly with induction of the magnetic field. At every induction level changes in the evoked potentials of the hypothalamus were more distinct than those of the cortex. These findings were compared with the effects of a weakly pulsating magnetic field of the induction 0.1-0.4 T.

Author

recorded. Differences between the parameters for the tested groups were not demonstrated. Differences between ENG recorded both before and after work failed to demonstrate differences. This finding demonstrates that there were no gross disturbances in the vestibular system.

R.J.F.

N82-31911# Joint Publications Research Service, Arlington, Va.
CYTOGENETIC EFFECTS OF HIGH-ENERGY CHARGED PARTICLES

R. D. Govorun, S. V. Vorozhtsova, and V. N. Gerasimenko *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. (JPRS-81599) 20 Aug. 1982 p 98-102 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 64-67*

Avail: Issuing Activity

The cytogenetic effects of irradiation were investigated in the bone marrow and corneal epithelium of mice, human white blood cells, and Stamm V79-4 cells of Chinese hamsters exposed to protons with energy = 9.2 GeV, deutons and helium ions with energy = 4.6 GeV/nucleon. It was demonstrated that with an increase in the irradiation dose the number of aberrant cells and chromosome aberrations grew. A high yield of exchange type aberrations was found. The proliferative activity of cells of bone marrow decreased and its depletion occurred. The relative biological effectiveness coefficients of high-energy particles varied from 1.3 to 2.7 in relation to the cell type and parameters measured.

R.J.F.

N82-31912# Joint Publications Research Service, Arlington, Va.
CYTOGENETIC EFFECTS OF HEAVY CHARGED PARTICLES OF GALACTIC COSMIC RADIATION IN EXPERIMENTS ABOARD COSMOS-1129 BIOSATELLITE

L. V. Nevgodina and Ye. N. Maksimova *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 103-108 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 67-71*

Avail: Issuing Activity

An experiment was carried out on lettuce (*Lactuca sativa*) seeds flown in a biocontainer equipped with plastic detectors to record heavy charged particles (HCP). The purpose of the experiment was to determine the yield of aberrant cells as a result of irradiation, and to identify this effect as a function of HCP topography in the seed. The cytogenetic examination of flight seedlings revealed a significant difference between the seeds which were hit with HCP and those that remained intact. This indicates a significant contribution of the heavy component of galactic cosmic radiation into the radiobiological effect. The relationship between the radiobiological effect and the HCP topography in the seed was established: zones of the root and stem meristem proved to be the most sensitive targets.

Author

N82-31913# Joint Publications Research Service, Arlington, Va.
MEASUREMENT OF VESTIBULAR ASYMMETRY IN ROTATION TESTS

T. A. Nalimova, A. B. Savinkov, and R. V. Kofanov *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 109-111 Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 71-72*

22-51) Avail: Issuing Activity

In order to detect transient vestibular dysfunctions, a group of 30 workers who were regularly exposed to noise and vibration at work were examined. A control group of 15 subjects was also examined. Rotation to the left and right in a Barany chair with sudden stopping was used. Electronysthograms (ENG) were

N82-31914# Joint Publications Research Service, Arlington, Va.
COMPARATIVE EVALUATION OF INFORMATIVENESS OF THREE CORRECTED ORTHOGONAL LEADS AND TWELVE CONVENTIONAL EKG LEADS IN CONDUCTING FUNCTIONAL TESTS

V. D. Turbasov and Z. A. Golubchikova *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 112-116 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 72-75*

Avail: Issuing Activity

Data pertaining to the comparative evaluation of electrocardiogram (EKG) information obtained through the use of 3 corrected orthogonal leads as opposed to 12 conventional EKG leads is given. Statistically significant differences were observed with respect to some parameters. It was concluded, however, that the resemblance of dynamics of EKG parameters in direct and synthesized leads indicates that the coordinate system of the later does not change appreciably tests, as compared to the coordinate system of direct coordinate system of direct EKG leads.

R.J.F.

N82-31915# Joint Publications Research Service, Arlington, Va.
DIAGNOSTIC USE OF ENZYMATIC TEST IN EXPERIMENTS ON MONKEYS

G. S. Belkaniya and N. I. Lemondzhava *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, no. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 117-126 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 75-81*

Avail: Issuing Activity

Standard data on serum activity of the three most widely used enzymes in clinical practices were analyzed, as was as the direction of enzymatic changes in the presence of various functional and pathological states in monkeys, in order to elaborate enzymodiagnostic criteria. Four hundred sixty one healthy monkeys were examined.

R.J.F.

N82-31916# Joint Publications Research Service, Arlington, Va.
SYSTEM FOR AUTOMATIC ANALYSIS OF RHEOENCEPHALOGRAMS

I. V. Sokolova and Kh. Kh. Yarullin *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 127-130 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 81-83*

Avail: Issuing Activity

The automation of rheoencephalogram (REG) processing is discussed. The method for REG analysis stipulates that the rheographic curve $Reg(t)$ for the duration of the cardiac cycle (T) reflects pulsating fluctuations in volumetric filling of blood in the examined vascular zone is such a manner that it can be rendered in the form of the sum of two components, $a(t)$ and $b(t)$, reflecting volumetric pulsation of the arterial and venous systems, respectively.

R.J.F.

N82-31917# Joint Publications Research Service, Arlington, Va.
PREFLIGHT EXAMINATION RESULTS USED TO FORECAST COSMONAUT ENDURANCE OF ORTHOSTATIC TESTS AFTER SPACEFLIGHT

V. A. Degtyarev, Yu. M. Dovzhenko, L. A. Larionova, V. G. Doroshev, and N. A. Lapshina *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599) 20 Aug. 1982 p 131-135 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 83-85*

Avail: Issuing Activity

The possibility of forecasting the postflight physical condition

of cosmonauts in the readaptation period on the basis of preflight examination findings is discussed. R.J.F.

N82-31918# Joint Publications Research Service, Arlington, Va. **RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM AND ELECTROLYTE METABOLISM IN RAT BLOOD AFTER FLIGHT ABOARD COSMOS-1129 BIOSATELLITE**

R. Kvetnansky, R. A. Tigranyan, A. Jindra, and T. A. Viting *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599)* 20 Aug. 1982 p 136-138 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, No. 4, Jul. - Aug. 1982 p 85-87

Blood plasma aldosterone concentration and renin activity were studied in rats flow in space on the Cosmos 1129 satellite using radioimmunoassay techniques. Immediately after the flight, the animals presented significant decreases in plasma renin activity, as compared to rats in the vivarium control and animals in the synchronous experiment. R.J.F.

N82-31919# Joint Publications Research Service, Arlington, Va. **EPINEPHRINE AND NOREPINEPHRINE CONCENTRATIONS IN RAT CARDIAC VENTRICLES AND ATRIA AFTER FLIGHT ABOARD COSMOS-1129 BIOSATELLITE**

R. Kvetnansky and R. A. Tigranyan *In its USSR Rept: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599)* 20 Aug. 1982 p 139-142 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 87-89

Demonstrable concentrations of norepinephrine and epinephrine in the four compartments of the myocardium of rats aboard the Cosmos 1129 satellite were analysed. Findings confirmed the hypothesis that there is elevation of the catecholamine level in the heart after spaceflights, probably due to the diminished functional load in weightlessness. Thus, this state is not a chronic stressor. However, some parts of the heart reacted to spaceflight by a drop in the norepinephrine level. R.J.F.

N82-31920# Joint Publications Research Service, Arlington, Va. **RAT BLOOD PLASMA CORTICOSTERONE AFTER FLIGHT ABOARD COSMOS-1129 BIOSATELLITE**

R. Kvetnansky and R. A. Tigranyan *In its USSR Rept: Space Biol. and Aerospace Med., Vol. 16, no. 4, Jul. - Aug. 1982 (JPRS-81599)* 20 Aug. 1982 p 143-145 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 16, no. 4, Jul. - Aug. 1982 p 89-90

Avail: Issuing Activity

The question of whether prolonged weightlessness is a chronic activator of the adrenal cortex was investigated. It was found that prolonged weightlessness is not a chronic activator. R.J.F.

N82-31921# Joint Publications Research Service, Arlington, Va. **DEOXYRIBONUCLEOPROTEIN AND NUCLEIC ACID CONTENT OF RAT TISSUES AFTER FLIGHT ABOARD COSMOS-936 BIOSATELLITE**

E. Misurova, R. A. Tigranyan, K. Kropaceva, and M. Praslicka *In its USSR Rept.: Space Biol. and Aerospace Med., Vol. 16, No. 4, Jul. - Aug. 1982 (JPRS-81599)* 20 Aug. 1982 p 146-150 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), V. 16, no. 4, Jul. - Aug. 1982 p 91-93

Avail: Issuing Activity

Changes in tissue levels of soluble polydeoxyribonucleoprotein-svin an artificial gravity (DDR) environment aboard the Cosmos 936 biosatellite were studied. DDR levels more than doubled in the spleen of rats submitted to weightlessness, as compared to vivarium and synchronous control groups. R.J.F.

N82-31922* National Aeronautics and Space Administration, Washington, D. C.

AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES

Jul. 1982 111 p
(NASA-SP-7011(234); NAS 1.21:7011(234)) Avail: NTIS

HC \$7.00 CSCL 06E

This bibliography lists 356 reports, articles and other documents introduced into the NASA scientific and technical information system in June 1982. Author

N82-31923 Royal Naval Personnel Research Committee, London (England). **Applied Psychology Unit.**

A TRIMIX SATURATION DIVE TO 660 METERS: STUDIES OF COGNITIVE PERFORMANCE, MOOD AND SLEEP QUALITY

Robert H. Logie and Alan D. Baddeley Mar. 1982 24 p refs (RPN-2/82; BR83533) Avail: Issuing Activity

An He-O₂-N₂ (Trimix) gas mixture was tested. Data were obtained from two divers on cognitive performance tests (arithmetic ability, grammatical reasoning, perceptual speed, visuo-spatial manipulation and semantic processing) during a simulated dive to 660 msw. At maximum depth there is a severe blanket impairment of ability to perform any of the tests. At shallower depths, impairments are not as marked, with performance at 300 msw close to that measured at surface pressure. Sleep quality is disrupted throughout the dive, with one subject affected more than the other. Mood patterns vary less systematically, with large individual differences. Low correlations between sleep quality and performance indicate that performance decrements are due almost entirely to breathing Trimix at high pressure. Author (ESA)

N82-31924# California Univ., Berkeley. Lawrence Berkeley Lab. Lighting Systems Research Dept.

NEW LOOK AT MODELS OF VISUAL PERFORMANCE

Robert Clear and Samuel Berman Jun. 1981 25 p refs Presented at the Illuminating Eng. Soc. Ann. Tech. Conf., Toronto, 9-13 Aug. 1981

(Contract W-7405-eng-48)

(DE82-001337; LBL-12496; CONF-810862-2) Avail: NTIS HC A02/MF A01

A discussion of the failure of a report on lighting recommendations to explicitly consider cost-effectiveness is presented. It is argued that in visual performance experiments, accuracy is as much a function of the relative worth of speed and accuracy as it is of visibility. In a task that consists of subtasks, such as comparing two lists, it may be necessary to explicitly model the effect of each subtask's visibility on speed and accuracy. Finally changes in print may be significant in that they can lead to changes in visual performance without a corresponding change in visibility. The current Commission Internationale de L'Elairage (CIE) model for visual performance CIE 19/2, does not consider the above factors. Although it is believed that the CIE model is not useful as an application model, it is felt that the general features of the visibility/visual performance relationship are clear and are important to lighting design. DOE

N82-31925# Sandia Labs., Albuquerque, N. Mex.

SNLA HOST-TO-HOST TRANSFER SYSTEM

1981 36 p refs

(Contract DE-AC04-76DP-00789)

(DE82-000089; SAND-81-2071C; CONF-811045-1) Avail: NTIS HC A03/MF A01

A host to host system is used to transmit files or elements between an 1108 and 1100/82 via an intercomputer coupler. The software that implements the host to host capability is discussed. DOE

N82-31926# Los Alamos Scientific Lab., N. Mex.

MEDICAL USES OF ACCELERATORS

James N. Bradbury 1981 50 p refs Presented at the 6th Intern. Summer Coll. on Phys. and Contemporary Needs, Islamabad, Pakistan, 15 Jun. 1981

(Contract W-7405-eng-36)

(DE82-000572; LA-UR-81-2805; CONF-8106159-1) Avail: NTIS HC A03/MF A01

Particle accelerators and their uses in connection with medically-related research, diagnosis, and treatment are discussed. For cancer radiotherapy, nuclear particles including protons, neutrons, heavy ions, and negative pi mesons have advantages compared

to conventional radiations in terms of dose localization and/or biological effectiveness. Clinical evaluations of these particles are underway at a number of institutions. Accelerator-produced radionuclides are in widespread use for research and routine diagnostic purposes. Elemental analysis techniques with charged particles and neutrons are being applied to bone, blood, and other tissues. Finally, low-dose medical imaging can be accomplished with accelerated protons and heavy ions. The status and future of these programs are discussed. DOE

N82-31927# Sandia Labs., Albuquerque, N. Mex.

IMPLANTABLE, REMOTELY-PROGRAMMABLE INSULIN INFUSION SYSTEM

G. A. Carlson, Raymond E. Bair, John I. Gaona, Jr., Jerry T. Love, and Ruben S. Urenda Oct. 1981 43 p refs (Contracts DE-AC04-76DP-00789; AT(29-1)-789; Grant NIH-HD-11327-01)

(DE82-003084; SAND-81-2152) Avail: NTIS HC A03/MF A01

An implantable, remotely programmable insulin infusion system which has a mass of 280 grams and an implanted lifetime exceeding 2 years is described. The system uses a rotary solenoid-driven peristaltic pump controlled by low power CMOS timing circuitry which provides bimodal insulin delivery. Fifteen low rates from 0.39 to 5.9 units/hour and 15 high doses from 0.84 to 12.5 units using U100 insulin are available. GRA

N82-31928# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Biophysics.

FLUID DISTRIBUTION IN PROGRESSIVE PULMONARY EDEMA: A LOW-TEMPERATURE SCANNING ELECTRON MICROSCOPY STUDY Ph.D. Thesis

Gregory Ross Hook Jun. 1981 100 p refs (Contract W-7405-eng-48)

(DE82-002554; LBL-11516) Avail: NTIS HC A05/MF A01

High pressure pulmonary edema, a common medical disorder caused by venous hypertension following left ventricular heart failure, is discussed. Abnormal fluid accumulation in the alveolar air spaces results in a life threatening loss of respiratory function. The primary component of the fluid is water and therefore the study of water distribution in the alveolus can provide insight into high pressure pulmonary edema pathology. The new method of freeze fracture low temperature scanning electron microscopy (SEM) developed and applied to the study of pulmonary edema. This method combines freeze fracture sample preservation with SEM observation and retains pulmonary fluids in the frozen hydrated state for direct three dimensional SEM imaging of alveoli. Quantitative measurements of alveolar structures resulting from high pressure pulmonary edema were made from SEM micrographs. From these measurements a model for alveolar fluid distribution resulting from progressive high pressure edema was made. DOE

N82-31929# Oak Ridge National Lab., Tenn. Health and Safety Research Div.

PROBABILISTIC METHODOLOGY FOR ESTIMATING RADIATION INDUCED CANCER RISK

D. E. Dunning, Jr., R. W. Leggett, and L. R. Williams 1981 7 p Presented at the ANS/ENS Topical Meeting on Probabilistic Risk Assessment, Port Chester, N.Y., 20 Sep. 1981 (Contract W-7405-eng-26)

(DE82-001474; CONF-810905-22) Avail: NTIS HC A02/MF A01

A computer code was developed to provide a versatile and convenient methodology for radiation risk assessment. The code allows as input essentially any dose pattern commonly encountered in risk assessments for either acute or chronic exposures, and this includes consideration of the age structure of the exposed population. Results produced by the analysis include the probability of one or more radiation-induced cancer deaths in a specified population, expected numbers of deaths, and expected years of life lost as a result of premature fatalities. These calculations include consideration of competing risks of death from all other causes. The program also generates a probability frequency distribution of the expected number of cancers in any specified cohort resulting

from a given radiation dose. The methods may be applied to any specified population and dose scenario. DOE

N82-31930# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

NONINVASIVE TECHNIQUES FOR CARDIOVASCULAR EXAMINATION OF INTEREST IN AEROSPACE MEDICINE [TECHNIQUES NON-SANGLANTES DE L'EXPLORATION CARDIOVASCULAIRE INTERET EN MEDECINE AEROSPATIALE]

R. Carre May 1982 205 p refs In FRENCH (AGARD-AG-277(FR); ISBN-92-835-2109-9) Avail: NTIS HC A10/MF A01

In addition to standard electrocardiography and cardiac radiography, other noninvasive cardiological techniques used in the evaluation of pilots include the Holter technique, echocardiography, ultrasonics, and isotopic exploration. Special tests of interest in aerospace medicine are cardiac rheoplethymopathy with measurement of systolic period intervals, ballistocardiography, tests of lower body negative pressure, and tests using the tilt-table and the centrifuge. For individual titles, see N82-31931 through N82-31943.

N82-31931# Centre Principal d'Expertises Medicales du Personnel Navigant, Paris (France).

PRINCIPAL ELECTROCARDIOGRAPHIC ANOMALIES IN THE EVALUATION OF PILOTS [PRINCIPALES ANOMAIES ELECTROCARDIOGRAPHIQUES DANS L'EXPERTISE DU PERSONNEL NAVIGANT]

R. Carre, A. Didier, and H. Ille In AGARD Noninvasive Tech. for Cardiovascular Exam. of Interest in Aerospace Med. May 1982 p 1-4 refs In FRENCH

Avail: NTIS HC A10/MF A01

The cardiovascular system is the system most influenced by stress during the flight of high performance aircraft such as the Mirage 2000 or 4000 type. Military regulations covering the physical fitness of pilots requires absolute organic and functional integrity of the circulatory system and an electrocardiogram with six peripheral and precordial derivations is obtained at each evaluation of pilots of such aircraft. Unfitness is easily pronounced for rhythm problems, flutter, auricular fibrillation, trouble in condition, complete right or complete left bundle branch block, and effects of myocardial infarction. Electrocardiograms are discussed with focus on: (1) rhythm irregularities; (2) incomplete right bundle branch block; (3) left axis deviations and their relation to the left anterior hemiblock concept; the Wolf Parkinson White syndrome; and (5) irregularities of ventricular polarization. Transl. by A.R.H.

N82-31932# Hopital d'Instruction des Armees, Paris (France). **VENTRICULAR PREEXCITATION SYNDROMES [LES SYNDROMES DE PRE-EXCITATION VENTRICLAIRE]**

J. Droniou In AGARD Noninvasive Tech. for Cardiovascular Exam. of Interest in Aerospace Med. May 1982 p 15-25 refs In FRENCH

Avail: NTIS HC A10/MF A01

Ventricular preexcitations constitute a group of conduction anomalies involving the premature activation of all or part of the ventricle by normal sine wave excitation. They can be asymptomatic, reduced to their electrocardiograph signatures alone or complicated with arrhythmias, which are often serious. The asymptomatic forms are the source of difficulties in the evaluation of pilots for two reasons: certain electrocardiograph anomalies suggestive of preexcitation do not have an unambiguous significance, and the prognosis is not easily predicted. Transl. by A.R.H.

N82-31933# Service de Medecine Aeronautique, Versailles (France).

THE EXERCISE ELECTROCARDIOGRAM [ELECTROCARDIOGRAMME D'EFFORT]

G. Leguay and A. Seigneuric In AGARD Noninvasive Tech. for Cardiovascular Exam. of Interest in Aerospace Med. May 1982

p 27-66 refs In FRENCH

Avail: NTIS HC A10/MF A01

The physiological basis of exercise electrocardiography (EKG) is reviewed with emphasis on muscular contraction, maximum oxygen consumption, pulmonary exchanges, and the adaptation of circulation and of the heart to exercise. Indications and contraindications for the use of stress tests are discussed. The types, placement, and fixation of electrodes are among the basic techniques of exercise EKG described. Modalities of exercise are considered. Normal exercise EKG in coronary insufficiency, the diagnostic value of exercise EKG in coronary insufficiency, the use of the EKG as a criteria in determining severity of coronary insufficiency, and the prognostic value of stress EKG's are examined.

Transl. by A.R.H.

N82-31934# Service de Medecine Aeronautique, Versailles (France).

CONTINUOUS ECG REGISTRATION ACCORDING TO THE HOLTER METHOD [ENREGISTREMENT CONTINU DE L'E.C.G. SELON LA METHODE DE HOLTER]

G. Leguay and A. Seigneuric /n AGARD Noninvasive Tech. for Cardiovascular Exam. of Interest in Aerospace Med. May 1982 p 67-86 refs In FRENCH

Avail: NTIS HC A10/MF A01

In 1949, Holter implemented a process which allows for the continuous recording of ECG's during ambulation. This process not only permits almost instantaneous knowledge of the electrical activity of the heart but also allows for modification of certain concepts, particularly with regards to arrhythmia. With constant improvement, this method presents two large centers of interest to cardiology: rhythm problems and the supervision of their treatment, and the repolarization problem. The technical modalities of the method are reviewed and implications for cardiology are summarized in order to suggest aspects of interest in aerospace medicine.

Transl. by A.R.H.

N82-31935# Centre Principal d'Expertises Medicales du Personnel Navigant, Paris (France).

THE CONTRIBUTION OF STANDARD RADIOGRAPHY IN CARDIOVASCULAR EXPLORATION DURING THE EXAMINATION OF PILOTS [APPORT DE LA RADIOGRAPHIE STANDARD DANS L'EXPLORATION CARDIO-VASCULAIRE AU COURS DE LA VISITE DU PERSONNEL NAVIGANT]

M. Puech and P. J. Metges (Hopital d'Instruction des Armees) /n AGARD Noninvasive Tech. for Cardiovascular Exam. of Interest in Aerospace Med. May 1982 p 87-92 refs In FRENCH

Avail: NTIS HC A10/MF A01

Teleradiography of the heart and televised radiography are integrated and articulated in complementary cardiologic examinations. Nonbloody radiological techniques and their normal results are described as well as their contribution in a number of pathological situations usually encountered which can pose problems of fitness. Congenital cardiopathy, acquired valvular cardiopathy, and ischemic and obstructive cardiopathies are discussed as well as physiological factors affecting the size and shape of the heart in athletes and Africans.

Transl. by A.R.H.

N82-31936# Centre Principal d'Expertises Medicales du Personnel Navigant, Paris (France).

THE CONTRIBUTION OF CARDIAC MECHANOGRAMS IN THE EVALUATION OF PILOTS [APPORT DES MECANOGRAMMES CARDIAQUES DANS L'EXPERTISE DU PERSONNEL NAVIGANT]

R. Carre, R. Amoretti, A. Didier, and H. Ille /n AGARD Noninvasive Tech. for Cardiovascular Exam. of Interest in Aerospace Med. May 1982 p 93-112 In FRENCH

Avail: NTIS HC A10/MF A01

The idea of graphically registering carotid pulsations or the apexogram is not recent, having been used in the nineteenth

century by Chaveau, Marey, and Maceray. If such recordings were valuable to physiologists, they have been of little value to clinicians and experts on pilots. These nonbloody techniques are easily reproducible at each examination and tracings can be included in the pilot's file for comparison from one examination to another. Cardiac mechanograms provide three classes of information: (1) analysis of the heart murmur indicates the variety of cardiopathy by phonocardiography; (2) the study of arterial distensibility by the carotidogram; and (3) chronocardiographic measure by the study of systolic intervals, permitting determination of the value of myocardial muscle contraction.

Transl. by A.R.H.

N82-31937# Hopital d'Instruction des Armees, Paris (France). **ECHOCARDIOGRAPHY IN THE EXAMINATION OF PILOTS [L'ECOCARDIOGRAPHIE DANS L'EXPERTISE DU PERSONNEL NAVIGANT]**

J. Droniou and A. Coignard /n AGARD Noninvasive Tech. for Cardiovascular Exam. of Interest in Aerospace Med. May 1982 p 113-143 In FRENCH

Avail: NTIS HC A10/MF A01

Echocardiography permits visualization of intracardiac structures thanks to the reflection of an ultrasonic beam by these structures. Introduced into the clinic in the 1950's, this technique has made an extraordinarily rapid advance, to the point of becoming an indispensable requirement in cardiologic examination. Its nonaggressive character and its relative simplicity in operation, warrants repetition of the examination at will. Its sensitivity and reliability in experienced hands should give it an important place in the cardiological evaluation of pilots.

Transl. by A.R.H.

N82-31938# Hopital d'Instruction des Armees, Versailles (France). **EXAMINING ARTERIAL FUNCTION BY DOPPLER VELOCIMETRY: THE ADVANTAGE IN AEROSPACE MEDICINE [EXPLORATION FONCTIONNELLE ARTERIELLE PAR VELOCIMETRIE DOPPLER INTERET EN MEDECINE AERONAUTIQUE ET SPATIALE]**

A. Didier, H. Ille, C. Ribadeau-Dumas, Ph. Lantrade, and Ch. Hiltzenbrand /n AGARD Noninvasive Tech. for Cardiovascular Exam. of Interest in Aerospace Med. May 1982 p 145-158 refs In FRENCH

Avail: NTIS HC A10/MF A01

Since the work done by Satomura and Kato in Japan in the 1960's, the use of the Doppler effect to measure the rate of blood flow in vessels has developed and met with considerable success, particularly in France. It has become a routine examination in angiography. The precision of the data obtained and the total innocuousness of this investigative method requires that its place be defined in aeronautical and aerospace medicine for the medical evaluation of pilots as well as for the study of the physiological modification of arterial flow in organisms subjected to actual aeronautical and space constraints.

Transl. by A.R.H.

N82-31939# Hopital d'Instruction des Armees, Paris (France). **CONTRIBUTION OF NUCLEAR MEDICINE IN CARDIOLOGY [APPORT DE LA MEDECINE NUCLEAIRE EN CARDIOLOGIE]**

J. F. Gaillard /n AGARD Noninvasive Tech. for Cardiovascular Exam. of Interest in Aerospace Med. May 1982 p 159-166 refs In FRENCH

Avail: NTIS HC A10/MF A01

Isotopic exploration techniques have a practically undeniable place among complementary cardiological examinations. In 1948 a radiocardiogram was introduced which recorded by external detection the dilution curve in cardiac cavities using a radioactive detector. Static scintigraphy appeared in 1964, and in the 1970's, the gamma camera was coupled with a computer to permit rapid dynamic studies with image processing. Benefiting from the same electronic progress and the same image reconstruction algorithm as tomodensitometry, gamma emission tomography obtained results in studies of vascularization and metabolism of the myocardium. Isotopic methods furnish data which, for the most part, were obtained only by bloody radiological explorations using the products of contrast and ultrasonics. Nuclear medicine is

interested in the noninvasive functional study of an organ and the possibility of quantifying organ function and of describing it by curves, graphics, and images. To the expert, nuclear medicine is important because of the noninvasive character of most of the techniques used. Those techniques having an invasive character which are excluded in the initial step in pilot evaluation are cited.

Transl. by A.R.H.

N82-31940# Rome Univ. (Italy). Inst. Universitaire de Medecine Aerospatiale.

BALLISTOCARDIOGRAPHY: A NONINTRUSIVE METHOD MOVING TOWARDS CLINICAL APPLICATIONS [LA BALISTOCARDIOGRAPHIE: UNE METHODE NON-INTRUSIVE AVANCANT VERS DES APPLICATIONS CLINIQUES]

A. deScano *In* AGARD Noninvasive Tech. for Cardiovascular Exam. of Interest in Aerospace Med. May 1982 p 167-181 refs in FRENCH

Avail: NTIS HC A10/MF A01

Ballistocardiography (BCG) can be defined as a noninvasive experimental method of recording and studying periodic accelerations of the mass of a body due to the reaction of inertial which it represents at each ventricular systole. The typical sequence of waves which constitutes BCG markings differ quantitatively according to the axis of the body (and also according to the state of repose and physical exercise), the age and pathological conditions of the body, and/or the large arterial vessels. The evolution of BCG from work one by J.W. Gordon in 1877 to the present is reviewed. Physiological factors determining the characteristics of the tracings, possible uses in detecting coronary disease and myocardial infarction, and research into three dimensional BCG and applications in microgravity environments are discussed.

Transl. by A.R.H.

N82-31941# Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris (France).

THE ADVANTAGE OF THE TILT TABLE TEST IN EXAMINING CIRCULATORY FUNCTION [INTERET DU TEST A LA TABLE BASCULANTE EN EXPLORATION FONCTIONNELLE CIRCULATOIRE]

J. Timbal *In* AGARD Noninvasive Tech. for Cardiovascular Exam. of Interest in Aerospace Med. May 1982 p 183-190 refs in FRENCH

Avail: NTIS HC A10/MF A01

Although asking the subject to change position (rise from bed and stand immobile) is the simplest means of evaluate the transition from clinostatism to orthostatism, the results obtained are difficult to standardize because the calling into action of muscles affects the circulatory condition. The tilt table can be used evaluate objectively the rapidity and efficiency of cardiovascular reactions by modifying the application of the force of gravity. Short term effects during the transition from the horizontal to the vertical position are considered with respect to their value in examinations of circulatory function. The use of the tilt table in the selection of astronauts and in determining physical fitness is discussed and possible reasons for not using this method systematically are offered.

Transl. by A.R.H.

N82-31942# Laboratoire de Medecine Aerospatiale, Bretigny-sur-Orge (France).

THE ADVANTAGE OF THE LOWER BODY NEGATIVE PRESSURE TEST IN AEROSPACE MEDICINE [INTERET DU TEST LOSER BODY NEGATIVE PRESSURE EN MEDECINE AEROSPATIALE]

B. Vettes and H. Viellefond *In* AGARD Noninvasive Tech. for Cardiovascular Exam. of Interest in Aerospace Med. May 1982 191-194 refs in FRENCH

Avail: NTIS HC A10/MF A01

The study of the physiopathological effects of weightlessness is not easy since these effects appear only when the human organism escapes the attractive forces of Earth. It is necessary to resort to simulation to examine the functions of the different physiological systems implicated. Simulation of the incidence of weightlessness on the cardiovascular system shows that physio-

pathological effects appear very early leading to a new distribution of blood volume. So-called orthostatic tests reveal interesting elements of hemodynamic response. The tests actually provide two classes of blood volume repartition conforming to that observed during prolonged space flight and during the return to Earth. Some tests such as those carried out on a tilt table during long duration bed rest involve modification of the posture of the entire organism. Other tests simulate the difference of ambient pressure between the upper and lower parts of the body by creating a mobilization of the blood volume in regions where ambient pressure is weakest.

Transl. by A.R.H.

N82-31943# Laboratoire de Medecine Aerospatiale, Bretigny-sur-Orge (France).

TECHNIQUES FOR CARDIOVASCULAR EXAMINATION IN HUMAN CENTRIFUGES AND THE PRINCIPAL RESULTS OBTAINED [LES TECHNIQUES D'EXPLORATION CARDIOVASCULAIRE EN CENTRIFUGEUSE HUMAINE ET LES PRINCIPAUX RESULTATS OBTENUS]

B. Vettes and H. Viellefond *In* AGARD Noninvasive Tech. for Cardiovascular Exam. of Interest in Aerospace Med. May 1982 p 195-203 refs in FRENCH

Avail: NTIS HC A10/MF A01

Sustained Gz and Gx accelerations have an undeniable effect on the cardiovascular system and consequently the use of a human centrifuge must always be made under strict surveillance of cardiovascular function, preferably using noninvasive techniques. The use of phonocardiography, electroplethysmography, rheoplethysmography, and pneumatic devices to record heart rate, arterial and venous pressure, and cardiac and local debits is described. The number and placement of the electrodes and the tracings obtained in electrocardiography are discussed as well as methods for determining peripheral light loss and central light dim as indications of hemodynamic tolerance as reflected in the visual field. The value of the centrifuge in studying the effectiveness of anti-g suits is also assessed.

Transl. by A.R.H.

N82-31944# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

EFFECT OF SYNTHESIZED PROPELLER VIBRATION ON PASSENGER ANNOYANCE IN A TURBOPROP INTERIOR NOISE ENVIRONMENT

Sherman A. Clevenson Aug. 1982 20 p refs (NASA-TM-84515; L-15298; NAS 1.15:84515) Avail: NTIS HC A02/MF A01 CSCL 05H

The effect of synthesized propeller vibration on passenger annoyance to aircraft noise was investigated in passenger ride quality apparatus. Passenger reactions of annoyance to a wide range of potential turboprop interior noise environments were obtained under three simulated vibration conditions: no vibration, armrest vibration, and armrest plus cabin vibration. The noises, ranging from 71 to 95 dB(A) consisted of a turbulent boundary layer with a factorial combination of five blade passage frequencies (50 to 200 Hz), two harmonic roll offs, and three tone to noise ratios. Results indicate that passenger annoyance to noise in the presence of armrest vibration did not significantly change. However, those passengers exposed to cabin plus armrest vibration while being exposed to noise lower rating for the combined cabin vibration and noise environment compared with the rating for the noise along environment. This result is predicted by the ride quality model.

S.L.

N82-31945# Royal Aircraft Establishment, Farnborough (England).

THE AIRLINE PILOT'S VIEW OF FLIGHT DECK WORKLOAD: A PRELIMINARY STUDY USING A QUESTIONNAIRE

G. A. Ellis and A. H. Roscoe Feb. 1982 26 p refs (RAE-TM-FS(B)-465; BR83316) Avail: NTIS HC A03/MF A01

A self-administered questionnaire was distributed to 116 civil airline pilots in order to establish pilots' views on workload as a concept and from the viewpoint of their own flying task. Of the 98 questionnaires returned, 80% indicated that pilots think of workload as being related to effort. Several pilots differentiate between subjective and objective workload. The marked diversity

of opinion as to the workload associated with various tasks or flight phases, e.g., landing or radio communication, is highlighted.

Author (ESA)

N82-31946# Systems Research Labs., Inc., Dayton, Ohio.
THE EFFECTS OF COLOR AND CONTRAST ON TARGET RECOGNITION PERFORMANCE USING MONOCHROMATIC TELEVISION DISPLAYS M.S. Thesis

Alan R. Pinkus Wright-Patterson AFB, Ohio AMRL May 1982
 46 p refs

(Contract F33615-79-C-0503; AF Proj. 7184)
 (AD-A116238; AFAMRL-TR-82-9) Avail: NTIS HC A03/MF A01
 CSCL 05/10

White, green, and red monochromatic television phosphors are used in a variety of military display systems, without consideration to their potential effect on an operator's target recognition performance. Since display contrast is known to have a significant effect on target recognition performance, it was also included as a variable to examine possible interaction effects. Target recognition performance was operationally defined as the visual angle (degrees) subtended by a group target, viewed via a television, at the time of recognition. Each of the twelve subjects viewed five different types of targets at four diagonal orientations, each under six television display conditions. For each trial, the target (located in the center of the television) started small and unrecognizable, then slowly enlarged until it became recognizable. At the moment of recognition, the subject pressed a projector stop button and identified the target. The experimenter then measured the target's size. Results showed that color did not significantly affect subject's target recognition performance ($p = 0.25$). Contrast was highly significant ($p < 0.001$), thereby replicating several previous studies. There was no color by contrast interaction ($p = 0.70$), but targets and color by targets were significant ($p < 0.0001$ and $p < 0.02$, respectively). GRA

N82-31947# Rockwell International Corp., El Segundo, Calif.
AIRCREW WINDBLAST PROTECTION CONCEPTS, DEVELOPMENT AND EVALUATION Final Report, Oct. 1979 - Jun. 1980
 R. J. Cummings and W. J. Adams Wright-Patterson AFB, Ohio Aerospace Medical Research Lab. Mar. 1982 86 p refs
 (Contract F33615-79-C-0528; AF Proj. 7231)
 (AD-A115424; NA-80-390; AFAMRL-TR-80-123) Avail: NTIS HC A05/MF A01 CSCL 01/3

The problem of protecting aircrews from limb injuries during high-speed ejection is addressed. Design criteria, data, and evaluation techniques that were developed to support the selection of an appropriate windblast protection device concept for the F-15 and F-16 fighter aircraft are described in detail. Several alternate arm and leg-restraint systems were designed, fabricated, and evaluated as part of the research effort. Test fixtures were designed and fabricated to simulate (1) cockpit geometry, (2) force relationships between the seat and man, (3) deployment and retraction of restraints in 0.1 second, and (4) seat/man separation dynamics. The evaluation of restraint concept performance using the prototypes, evaluation plan, and test fixtures is described. The selection criteria to identify the best restraint designs are presented. A test and evaluation plan for airworthiness verification is described to aid follow-on engineering development efforts.

Author (GRA)

N82-31948# Purdue Univ., Lafayette, Ind. School of Industrial Engineering.

LIFE-CYCLE COSTING OF LIFE SUPPORT EQUIPMENT Final Report, Apr. - Sep. 1980

Clifford C. Petersen, Colin L. Moodie, Jack Posey, Gary Schulties, and Jhitang Chen Dec. 1981 78 p

(Contract F33615-78-C-0627; AF Proj. 7930)
 (AD-A116404; SAM-TR-81-25) Avail: NTIS HC A05/MF A01
 CSCL 06/11

A feasibility study has been accomplished on applying life-cycle costing (LCC) to aircrew life support equipment (LSE). The AFLC Logistics Support Cost (LSC) model was examined and found to be too complex for application to life support devices (LSD). A

potentially useful simplification of the LSC model was developed and applied to the CRU-68 oxygen regulator and the FR139 and FR140 anti-G valves, but available logistics data were insufficient for these devices. An alternate model (LCC-LSD) was developed and applied with some success. The simpler computer program requires data much more accessible from the DO41, DO39, and DO62 data systems and has a plotting capability to graph LCC vs. changes in reliability or maintainability. Sensitivity analyses showed maintenance costs to be the key area where the U.S. Air Force could achieve significant savings (perhaps \$15 million).

Author (GRA)

N82-31949# Massachusetts Inst. of Tech., Cambridge. Man-Machine Systems Lab.

SUPERVISORY CONTROL: PROBLEMS, THEORY AND EXPERIMENT FOR APPLICATION TO HUMAN-COMPUTER INTERACTION IN UNDERSEA REMOTE SYSTEMS Technical Report, 1 Feb. 1981 - 31 Jan. 1982

Thomas B. Sheridan 1 Mar. 1982 144 p refs
 (Contract N00014-77-C-0256; NR Proj. 196-158)
 (AD-A116236) Avail: NTIS HC A07/MF A01 CSCL 17/2

This technical report provides an overview of a four-year theoretical and experimental research project on human-computer cooperation in remote control of undersea manipulators and vehicles. The report puts forth a theoretical framework for viewing supervisory control in terms of a hierarchical interaction of three fundamentally different types of control loops: (1) interaction of a human supervisor with a high level computer; (2) interaction between the high level and one or more low level computers; and (3) interaction of the low level computers with the environment as mediated through artificial sensors and effectors. The perspective is one of coordinated allocation of human and artificial resources to various functions at various levels and times within given tasks. Numerous problems are discussed in conjunction with human and computer cognition, display, command and control, matching capabilities to tasks and evaluation aspects. Experiments performed in our laboratory on human supervisory control of remote undersea manipulators, vehicles and dynamic processes are reviewed briefly in relation to the theoretical constructs. These draw upon already published detailed reports of each experiment. Author (GRA)

N82-31950# Sheffield Univ. (England). Dept. of Control Engineering.

THE BENCH MINING SYSTEM: PROGRESS IN TWO-DIMENSIONAL SIMULATION OF STEERING CHARACTERISTICS

J. B. Edwards Mar. 1982 19 p
 (RR-176) Avail: NTIS HC A02/MF A01

Computer programs which simulate the vertical steering characteristics of the thick seam bench mining system were adjusted, in order to eliminate unwanted penetration of the floor. A flow chart which describes program functions needed to obtain bench fit is presented. Results for a variety of floor profiles confirm the validity of the fitting routines, so these routines were incorporated into color graphics simulation programs. Effects of interaction between roof support and bench can be incorporated into the simulation routine. Roof support and roof beam fitting routines work well for chocks with a very short front extension, but less well for long based chocks.

Author (ESA)

N82-31951# Research Inst. of National Defence, Stockholm (Sweden).

READING TEXT FROM VISUAL DISPLAY UNITS

Yvonne Waern and Carl Rollenhagen (Stockholm Univ.) May 1982 38 p refs

(FOA-C-53006-H2) Avail: NTIS HC A03/MF A01

Psychological aspects of reading are reviewed, and problems faced by good readers who are unfamiliar with computers, but who have to work with visual display units (VDU) are discussed. Text processing theories and psychological investigation methodologies for factors affecting VDU operator performance are examined.

Author (ESA)

N82-31968

N82-31968*# SKF Technology Services, King of Prussia, Pa. Technology Services Div.

HIGH SPEED CYLINDRICAL ROLLER BEARING ANALYSIS. SKF COMPUTER PROGRAM CYBEAN. VOLUME 2: USER'S MANUAL Final Report

G. J. Dyba and R. J. Kleckner Jun. 1981 147 p refs

(Contract NAS3-22690)

(NASA-CR-165364; NAS 1.26:165364; SKF-AT81D049-Vol-2)

Avail: NTIS HC A07/MF A01 CSCL 09B

CYBEAN (CYlindrical BEaring ANalysis) was created to detail radially loaded, aligned and misaligned cylindrical roller bearing performance under a variety of operating conditions. Emphasis was placed on detailing the effects of high speed, preload and system thermal coupling. Roller tilt, skew, radial, circumferential and axial displacement as well as flange contact were considered. Variable housing and flexible out-of-round outer ring geometries, and both steady state and time transient temperature calculations were enabled. The complete range of elastohydrodynamic contact considerations, employing full and partial film conditions were treated in the computation of raceway and flange contacts. The practical and correct implementation of CYBEAN is discussed. The capability to execute the program at four different levels of complexity was included. In addition, the program was updated to properly direct roller-to-raceway contact load vectors automatically in those cases where roller or ring profiles have small radii of curvature. Input and output architectures containing guidelines for use and two sample executions are detailed. R.J.F.

N82-31969*# SKF Technology Services, King of Prussia, Pa. RESEARCH REPORT: USER'S MANUAL FOR COMPUTER PROGRAM AT81Y003 SHABERTH. STEADY STATE AND TRANSIENT THERMAL ANALYSIS OF A SHAFT BEARING SYSTEM INCLUDING BALL, CYLINDRICAL AND TAPERED ROLLER BEARINGS Final Report

G. B. Hadden, R. J. Kleckner, M. A. Ragen, and L. Sheynin May 1981 254 p refs

(Contract NAS3-22690)

(NASA-CR-165365; NAS 1.26:165365; SKF-AT81DO40) Avail: NTIS HC A12/MF A01 CSCL 09B

The SHABERTH program is capable of simulating the thermo-mechanical performance of a load support system consisting of a flexible shaft supported by up to five rolling element bearings. Any combination of ball, cylindrical, and tapered roller bearings can be used to support the shaft. The user can select models in calculating lubricant film thickness and traction forces. The formulation of the cage pocket/rolling element interaction model was revised to improve solution numerical convergence characteristics. S.L.

N82-31982# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Automatic Data Processing Center.

PRIMER ON COMPUTER GRAPHICS PROGRAMMING

Apr. 1982 232 p Prepared in cooperation with Military Academy

(AD-A116257; WES-INSTRUCTION-K-82-3) Avail: NTIS

HC A11/MF A01 CSCL 09/2

This report is a tutorial for learning graphics programming with the Graphics Compatibility System (GCS). GCS is a collection of ANSI standard FORTRAN subroutines invocable by a user's FORTRAN program. The report covers GSC's capabilities. GSC can produce a simple line drawing or handle comprehensive general purpose axis creation and automatic clipped; arc and conic generation; graphics input; secondary coordinate systems; multiple software character fonts; data structures; segmentation; and color. The report addresses both two- and three-dimensional graphics capability within GCS. GRA

N82-31983# Army War Coll., Carlisle Barracks, Pa. MUTUAL PROBLEM SOLVING THROUGH COMPUTER TIME SHARING

Robert J. Knez 16 Apr. 1982 45 p refs

(AD-A116718) Avail: NTIS HC A03/MF A01 CSCL 09/2

This paper suggests the use of an on-on computer time sharing system acting in the role of a communications facility serving a

community of subscribers who pose problems and tender solutions to one another anonymously. Subscribers to the system may be categorized by professional or academic discipline. They may also be aligned through the creation of associations which the computer will recognize. Subscribers may direct their problems to members of select disciplines, associations or by general broadcast. The system is intended to work through the mutual cooperation of its anonymous subscribers who are encouraged to make effective contributions by the mutual benefits to be gained as well as through a status based incentive system. Author (GRA)

N82-31984# Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.

INVESTIGATE CAPABILITY OF ADA HIGHER ORDER PROGRAMMING LANGUAGE FOR DEVELOPING MACHINE INDEPENDENT SOFTWARE Final Technical Report

L. J. Gallaher Griffiss AFB, N.Y. RADC Mar. 1982 110 p refs

(Contract F30602-78-C-0120; AF Proj. 5581)

(AD-A116070; RADC-TR-82-46) Avail: NTIS HC A06/MF A01

CSCL 09/2

In this investigation of the ability of ADA to support machine independent software, a library package of the elementary mathematical functions (sin, cos, en, etc.) was implemented and tested on the ADA/ED Compiler Version 11/4. The ADA language constructs proved quite useful and effective in creating the math function package. The programs were written and successfully syntax checked; however, flaws in this version of the compiler prevented a thorough debugging of these routines. The routines were designed to be machine and accuracy independent. Accuracy independence was obtained using variable length polynomials whose coefficients are computed (at compile time) from Chebyshev series. For increased efficiency, the normally machine dependent operations (bit picking) are isolated into subroutines that can be optimized for individual installations and hardware. Author (GRA)

N82-32298# Joint Publications Research Service, Arlington, Va. OPTICAL FIBER MULTIPLE SENSOR FOR GRIPPING COMPLEX OBJECTS

Michel Defaux *In its* West Europe Rept.: Sci. and Technol., No. 99 (JRPS-80536) 9 Apr. 1982 p 30-31 Transl. into ENGLISH from L'Usine Nouvelle (France), 11 Feb. 1982 p 48-49

Avail: NTIS HC A04

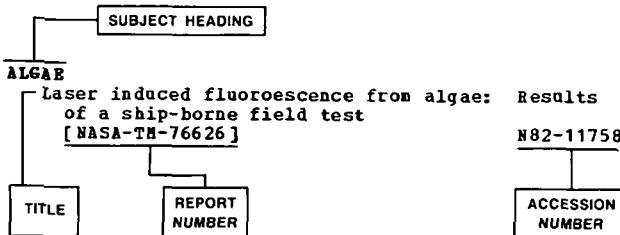
The development of an experimental grip for industrial robots which provides a sense of touch is announced. Multiple fiber optic sensors (Stafo) are integrated into the structure of the three fingers of the grip. Grasping tests on simple and complex geometrical shapes, and on deformable and fragile objects, including eggs, were performed. The grip was designed for use in the assembly of small parts (1 cu decimeter and 1 kg) such as are used in household appliances. J.D.

SUBJECT INDEX

AEROSPACE MEDICINE AND BIOLOGY/A *Continuing Bibliography (Suppl. 239)*

DECEMBER 1982

Typical Subject Index Listing



The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by three hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

ACCELERATION (PHYSICS)

Pulmonary function measures before and after exposure of human subjects to +G(z) and +G(x) acceleration loads
[AD-A114652] N82-30928

ACCELERATION PROTECTION

Dynamic preload as an impact protection concept
A82-44290

ACCELERATION STRESSES (PHYSIOLOGY)

The dynamics of certain psychophysiological indicators under the cumulative effect of Coriolis accelerations
A82-42995

A performance analysis study of a complex G field experiment
N82-30852

Modeling lateral acceleration effects on pilot performance
N82-30854

Effects of +G sub x acceleration and adenotropin on nuclei acid content and other parameters of mouse peripheral blood
N82-31909

ACCELEROMETERS

An analog tracking filter for a swept-sine human vibration test
A82-41808

ACETONE

Experimental study of the combined effect of noise and acetone
A82-42612

ACOUSTIC FATIGUE

The effect of general vibration combined with intermittent noise on the human auditory function
A82-42615

ACOUSTIC PROPAGATION

Detailed research plan: Cardiovascular effects of noise
[PB82-163379] N82-30934

ACTIVATION ENERGY

The interrelationship between the pressor response and energy metabolism during isometric muscle contractions
A82-43636

ACTIVITY (BIOLOGY)

Current problems in hypobiosis
A82-42171

Individual features in the organization of the human endocrinical system
A82-42631

The effect of body position and the administration of a diuretic on the water-salt status and the activity of the kidneys
A82-43238

Thermogenesis and muscle activity during the adaptation to cold --- Russian book
A82-43610

Changes of the functional condition of the neocortex during direct application of optical radiation
A82-43655

The mechanism of the activating effect of anti-cardiac antibodies on the electrical and contractile activity of myocardial cells
A82-43665

Aortic body chemoreceptor responses to dopamine, haloperidol, and pargyline
A82-44136

Regulation of glycogenolysis in human muscle at rest and during exercise
A82-44144

Protein kinase activity in liver of heat-acclimated hamsters
A82-44145

ACTIVITY CYCLES (BIOLOGY)

Regulation of circadian rhythmicity
A82-43383

Sleep and motor activity: Stages of the ontogenetic evolution of the supraspinal motor control in the human sleep cycle --- Russian book
A82-43607

ADAPTATION

A comprehensive system model for motion/space sickness: Preliminary results
N82-30855

Formation of systemic adaptation reactions in static magnetic fields
N82-30904

Preflight examination results used to forecast cosmonaut endurance of orthostatic tests after spaceflight
N82-31917

ADAPTIVE CONTROL

The adaptive control of vegetative processes --- biofeedback control of cardiovascular system
A82-43652

ADENOSINE TRIPHOSPHATE

Circulation and energetics of forearm muscles in man
A82-42604

ADENOSINES

The effect of drugs altering the exchange of cAMP on the bioelectrogenesis of skeletal muscles
A82-43653

ADRENAL GLAND

State of the endocrine glands in hypodynamia (A review of the literature)
[NASA-TM-76906] N82-30926

Activity of rat adrenal medula after flight aboard Cosmos-1129 biosatellite
N82-31905

Rat blood plasma corticosterone after flight aboard Cosmos-1129 biosatellite
N82-31920

ADRENAL METABOLISM

The influence of prostaglandins and polyunsaturated fatty acids on the corticosteroid metabolism of normal and spontaneously hypertensive rats
A82-42174

Biogenic monoamine content of the ganglia in the autonomic nervous system of rabbits during acute experimental emotional stress
[NASA-TM-76900] N82-30875

ADRENERGICS

Influence of stress on the blood system reaction in adrenalectomized mice [NASA-TM-76902] N82-30877
 Role of the thyroid gland during adaptation of skeletal muscles to increased motor activity [NASA-TM-76871] N82-30884
 Rat blood plasma corticosterone after flight aboard Cosmos-1129 biosatellite N82-31920

ADRENERGICS

The mechanisms of the development of the cardiogenic vagosympathetic reflexes A82-43631
 The responses of the coronary vessels in dogs to hypothalamic stimulation in acute and chronic experiments A82-43634

AERODYNAMICS

Aeronautical Engineering: A continuing bibliography with indexes [NASA-SP-7037(148)] N82-30917

AERONAUTICAL ENGINEERING

Aeronautical Engineering: A continuing bibliography with indexes [NASA-SP-7037(148)] N82-30917

AEROSPACE ENVIRONMENTS

Regional hemodynamic changes after spaceflights lasting up to eight days N82-31895

AEROSPACE MEDICINE

Medical monitoring and therapy of space motion sickness [IAF PAPER 82-169] A82-44684
 Medical support and technology for long-duration space missions [IAF PAPER 82-174] A82-44687
 A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limb, head and eyes N82-30853

USSR report: Space Biology and Aerospace Medicine, volume 16, no. 4, July - August 1982 [JPRS-81599] N82-31892
 Anesthesia, surgery and resuscitation during manned spaceflights N82-31894

Regional hemodynamic changes after spaceflights lasting up to eight days N82-31895
 Percutaneous measurement of partial oxygen tension and local blood flow in man during orthostatic test N82-31904

Activity of rat adrenal medulla after flight aboard Cosmos-1129 biosatellite N82-31905
 Stereological analysis of rat bone tissue after flight aboard Cosmos-1129 biosatellite N82-31906

Aerospace Medicine and Biology: A continuing bibliography with indexes [NASA-SP-7011(234)] N82-31922
 Noninvasive techniques for cardiovascular examination of interest in aerospace medicine [AGARD-AG-277(FR)] N82-31930

AFFERENT NERVOUS SYSTEMS

The organization of the afferent subcortical inputs of the visual region of the cat cerebrum A82-42621
 A morphological investigation of the regulatory mechanisms of the intracerebral blood circulation A82-42627

The influence of afferent visual impulses on the morphological and biochemical parameters of the development of the neurons of the visual, motor, and parietal cerebral cortices A82-42636

The role of the integrity of the central synaptic and direct influences in the regulation of hemodynamics A82-43628

AFFINITY

Geometrical considerations in the separation of biological particles by affinity partitioning N82-32069

SUBJECT INDEX**AGE FACTOR**

Effects of superhigh frequency electromagnetic fields on animals of different ages N82-30916

AGING (BIOLOGY)

Blood circulation and aging A82-42609

AIR TRAFFIC CONTROLLERS (PERSONNEL)

The condition of the cardiovascular system in air traffic controllers according to data acquired at the workplace A82-42614

AIRBORNE/SPACEBORNE COMPUTERS

Design and evaluation of an onboard computer-based information system for aircraft A82-44512

AIRCRAFT CONTROL

A computer simulation approach to measurement of human control strategy N82-30843

An analytical prediction of pilot ratings utilizing human pilot model N82-30847

A performance analysis study of a complex G field experiment N82-30852

AIRCRAFT DESIGN

The role of the test pilot in flight tests A82-43329

AIRCRAFT FUEL SYSTEMS

Biocorrosion -- of aircraft fuel tanks [SNTIAS-821-551-105] N82-31891

AIRCRAFT LANDING

Procru: A model for analyzing flight crew procedures in approach to landing N82-30863

AIRCRAFT NOISE

Effect of synthesized propeller vibration on passenger annoyance in a turboprop interior noise environment [NASA-TM-84515] N82-31944

AIRCRAFT PILOTS

FMP study of pilot workload. Qualification of workload via instrument scan [NASA-CR-169254] N82-30944
 Principal electrocardiographic anomalies in the evaluation of pilots N82-31931

ALDOSTERONE

Renin-angiotensin-aldosterone system and electrolyte metabolism in rat blood after flight aboard Cosmos-1129 biosatellite N82-31918

ALGAE

Algal culture studies related to a Closed Ecological Life Support System (CELSS) [NASA-CR-166375] N82-30943

ALLERGIC DISEASES

Effect of sensitization on development of stress gastric ulcers in rats [NASA-TM-76868] N82-30892

ALPHA JET AIRCRAFT

The role of the test pilot in flight tests A82-43329

ALTITUDE SIMULATION

Changes in the lymphoid organs of rats under the effect of acute hypoxia A82-42623

ALVEOLI

Hyperoxia inhibits stimulated superoxide release by rat alveolar macrophages A82-44143

AMINES

Polyamines and plant stress - Activation of putrescine biosynthesis by osmotic shock A82-44450

Biogenic monoamine content of the ganglia in the autonomic nervous system of rabbits during acute experimental emotional stress [NASA-TM-76900] N82-30875

AMINO ACIDS

Indices of the rat central nervous system metabolism during 36- and 60-day hypokinesia [NASA-TM-76870] N82-30883

AMMONIA

Morphology and coagulant function of human blood system during long exposure to low ammonia concentrations in a sealed environment N82-31903

SUBJECT INDEX

ANALOG CIRCUITS		AUDITORY PERCEPTION
An analog tracking filter for a swept-sine human vibration test	A82-41808	Effect of prolonged hypokinesia on resistance of resistive vessels in rats [NASA-TM-76849] N82-30878
ANALYSIS (MATHEMATICS)		Examining arterial function by Doppler velocimetry: The advantage in aerospace medicine N82-31938
Diffusion mediated localization on membrane surfaces [NASA-CR-166386]	N82-31888	
ANATOMY		
Regulation of circadian rhythmicity	A82-43383	ARTERIOSCLEROSIS
ANESTHESIA		Microcirculatory state in the case of chronic obliteration of arteries A82-42626
Anesthesia, surgery and resuscitation during manned spaceflights	N82-31894	Effect of restricted mobility on the composition and metabolism of blood lipoproteins in rabbits [NASA-TM-76846] N82-30871
ANGIOGRAPHY		Effect of immobilization on the development of experimental arteriosclerosis in rabbits [NASA-TM-76901] N82-30876
Examining arterial function by Doppler velocimetry: The advantage in aerospace medicine N82-31938		
ANIMALS		ARTIFICIAL GRAVITY
Plastic properties of motivation as prime component in systemic organization of purposeful behavioral acts	N82-30937	Deoxyribonucleoprotein and nucleic acid content of rat tissues after flight aboard Cosmos-936 biosatellite N82-31921
ANTARCTIC REGIONS		
Study of the morphological and biological properties of obligate and facultative psychrophilic bacteria found in the Antarctic	A82-43671	ARTIFICIAL INTELLIGENCE
ANTIADRENERGICS		Human factors and robotics: Current status and future prospects [AD-A115042] N82-30945
Activation of the cerebral gba-ergic inhibiting system in stress [NASA-TM-76867]	N82-30881	
ANTIBODIES		ASSESSMENTS
The mechanism of the activating effect of anti-cardiac antibodies on the electrical and contractile activity of myocardial cells	A82-43665	The airline pilot's view of flight deck workload: A preliminary study using a questionnaire [RAE-TM-FS(B)-465] N82-31945
ANTIFOULING		
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 6 [JPRS-81300]	N82-30899	ASSUMPTIONS
Stimulating effect of exposure of rat sternum to variable magnetic field on antibody production in the spleen	N82-30900	Application of optimal control principles to describe the supervisory control behavior of AAA crew members N82-30864
ANTIFOULING		
Coatings for the prevention of macrofouling in the OTEC program [DE82-003238]	N82-30897	ASTRONAUT PERFORMANCE
ANTIGENS		Psychophysiological performance examination onboard the orbital complex Salyut-Soyuz [IAF PAPER 82-171] A82-44686
Heart antigens	A82-43666	Preflight examination results used to forecast cosmonaut endurance of orthostatic tests after spaceflight N82-31917
ANTIRADIATION DRUGS		
Effects of +G sub x acceleration and adeutron on nuclei acid content and other parameters of mouse peripheral blood	N82-31909	ASTRONAUT TRAINING
AORTA		Medical monitoring and therapy of space motion sickness [IAF PAPER 82-169] A82-44684
Aortic body chemoreceptor responses to dopamine, haloperidol, and pargyline	A82-44136	
APOLLO PROJECT		ASYMMETRY
Effect of immobilization on the development of experimental arteriosclerosis in rabbits [NASA-TM-76901]	N82-30876	Measurement of vestibular asymmetry in rotation tests N82-31913
Information automation and the Apollo program - A retrospective	A82-44513	
APPROACH CONTROL		ATMOSPHERIC COMPOSITION
The effect of visual information on the manual approach and landing	N82-30837	Planetary atmospheres and the search for life [IAF PAPER 82-268] A82-44708
ARRHYTHMIA		ATMOSPHERIC EFFECTS
Ventricular preexcitation syndromes	N82-31932	Principles of biological and medical climatology --- Russian book A82-42065
Continuous ECG registration according to the Holter method	N82-31934	
ASENIDES		ATTENTION
Biological availability of nickel arsenides: Toxic effects of particulate Ni5As2 [DE82-000580]	N82-30932	The effects of the direction of attention on the transmission of cutaneous information --- French thesis A82-42083
ARTERIES		A model of human decision making in multiple process monitoring situations N82-30862
Microcirculatory state in the case of chronic obliteration of arteries	A82-42626	
ATTITUDE (INCLINATION)		ATTITUDE (INCLINATION)
A morphological investigation of the regulatory mechanisms of the intracerebral blood circulation	A82-42627	Dynamics of the process of the determination of orientation by man A82-43231
ATTITUDE GYROS		ATTITUDE GYROS
Pilot reaction to attitude gyro failure: A flight experiment		Pilot reaction to attitude gyro failure: A flight experiment N82-30858
AUDIOMETRY		
An on-line procedure for the extraction of acoustically evoked potentials from the electroencephalogram --- German thesis A82-41688		
AUDITORY PERCEPTION		AUDITORY PERCEPTION
The effect of general vibration combined with intermittent noise on the human auditory function		The effect of general vibration combined with intermittent noise on the human auditory function A82-42615
Psychophysical characteristics of perception and bioelectric activity of the brain during micropolarization of the occipital part of the hemispheres		Psychophysical characteristics of perception and bioelectric activity of the brain during micropolarization of the occipital part of the hemispheres A82-43235

AUDITORY SIGNALS

Brain-stem auditory evoked potentials in persons with normal hearing A82-43234

AUDITORY STIMULI

Brain-stem auditory evoked potentials in persons with normal hearing A82-43234

AUTOMATIC CONTROL

Experimental evaluation of the concept of supervisory manipulation N82-30869

System for automatic analysis of rheoencephalograms N82-31916

AUTOMATIC TEST EQUIPMENT

Logistics support productivity improvement A82-42196

AUTOMATION

Information automation and the Apollo program - A retrospective A82-44513

AUTOMOBILES

Proceedings of the Sixteenth Annual Conference on Manual Control [NASA-CR-169243] N82-30833

AUTONOMIC NERVOUS SYSTEM

Individual features of the vegetative regulation of body functions during the adaptation of sailors in the tropics A82-42996

The participation of the hypothalamus in the regulation of parasympathetic cardiac reflexes in unanesthetized cats A82-43633

The adaptive control of vegetative processes --- biofeedback control of cardiovascular system A82-43652

B

BACTERIOLOGY

Study of the morphological and biological properties of obligate and facultative psychrophilic bacteria found in the Antarctic A82-43671

BALLISTOCARDIOGRAPHY

Ballistocardiography: A noninvasive method moving towards clinical applications N82-31940

BEHAVIOR

An experimental study of human pilot's scanning behavior N82-30841

A computer simulation approach to measurement of human control strategy N82-30843

Plastic properties of motivation as prime component in systemic organization of purposeful behavioral acts N82-30937

BIBLIOGRAPHIES

Aeronautical Engineering: A continuing bibliography with indexes [NASA-SP-7037(148)] N82-30917

Aerospace Medicine and Biology: A continuing bibliography with indexes [NASA-SP-7011(234)] N82-31922

BINOCULAR VISION

An analysis and modeling of the binocular system in human sagittal vision --- French thesis A82-42090

Threshold models of spatial vision A82-43230

Absence of depth processing in the large-frame rod-and-frame effect --- human space perception A82-44823

Inhibition of the rod-and-frame effect by circular contours --- human depth perception A82-44824

BIOACOUSTICS

An on-line procedure for the extraction of acoustically evoked potentials from the electroencephalogram --- German thesis A82-41688

BIOASSAY

Investigation on the carcinogenic effect of trichlorethylene by inhalation and mechanisms of metabolic bioactivation [BMFT-FB-HA-82-007] N82-30933

BIOASTRONAUTICS

Medical monitoring and therapy of space motion sickness [IAF PAPER 82-169] A82-44684

The first joint Franco-Soviet manned flight - The posture experiment [IAF PAPER 82-183] A82-44689

USSR report: Space Biology and Aerospace Medicine, volume 16, no. 4, July - August 1982 [JPBS-81599] N82-31892

BIOCHEMISTRY

The influence of afferent visual impulses on the morphological and biochemical parameters of the development of the neurons of the visual, motor, and parietal cerebral cortices A82-42636

Regulation of circadian rhythmicity A82-43383

Distinctions of nervous system reactions to artificially intensified magnetic fields N82-30902

USSR report. Life sciences: Biomedical and behavioral sciences, no. 19 [JPBS-81442] N82-30935

BIOClimATOLOGY

Principles of biological and medical climatology --- Russian book A82-42065

Study of the morphological and biological properties of obligate and facultative psychrophilic bacteria found in the Antarctic A82-43671

BIOCONTROL SYSTEMS

The contraction, regulation, and functional role of lymph vessels A82-42603

A morphological investigation of the regulatory mechanisms of the intracerebral blood circulation A82-42627

Computer simulation of respiratory control system A82-43145

Regulation of circadian rhythmicity A82-43383

The intracentral connections of the brain structures participating in cardiovascular control A82-43627

The role of the integrity of the central synaptic and direct influences in the regulation of hemodynamics A82-43628

The adaptive control of vegetative processes --- biofeedback control of cardiovascular system A82-43652

Factors inducing periodic breathing in humans - A general model A82-44140

BIODYNAMICS

An investigation of the mechanical meaning of the surface electromyogram --- French thesis A82-42078

The relationship between postural components and voluntary movement A82-43239

Internal stresses and contractility of myocardium A82-43513

A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limb, head and eyes A82-30853

Status and prospects of research on biological and therapeutic effects of magnetic fields N82-30901

Diffusion mediated localization on membrane surfaces [NASA-CR-166386] N82-31888

Geometrical considerations in the separation of biological particles by affinity partitioning N82-32069

BIOELECTRIC POTENTIAL

An investigation of the mechanical meaning of the surface electromyogram --- French thesis A82-42078

Brain-stem auditory evoked potentials in persons with normal hearing A82-43234

The role of the extrapolation and dynamic stereotype in the mechanism of the formation and improvement of adequate motor coordination A82-43651

The mechanism of the activating effect of anti-cardiac antibodies on the electrical and contractile activity of myocardial cells A82-43665

BIOELECTRICITY

Hyperacuity and interpolation by the visual pathways A82-43100

Psychophysical characteristics of perception and bioelectric activity of the brain during micropolarization of the occipital part of the hemispheres A82-43235

The effect of drugs altering the exchange of cAMP on the bioelectrogenesis of skeletal muscles A82-43653

A cortically implantable multielectrode array for investigating the mammalian visual system [AD-A115484] N82-30931

BIOINSTRUMENTATION

Investigation of behaviorally modified rats for use in explosives detection systems [AD-A114632] N82-30895

BIOLOGICAL EFFECTS

The influence of prostaglandins and polyunsaturated fatty acids on the corticosteroid metabolism of normal and spontaneously hypertensive rats A82-42174

A systems analysis of individual vascular reactions in animals under experimentally induced emotional stress A82-42610

Experimental study of the combined effect of noise and acetone A82-42612

Comparative analysis of the biological effects of electromagnetic radiation. II - Eye damage. Cataractogenesis A82-43222

The mechanism of the activating effect of anti-cardiac antibodies on the electrical and contractile activity of myocardial cells A82-43665

Possible adaptation to strong magnetic fields --- by animals [IAP PAPER 82-188] A82-44690

Indices of the rat central nervous system metabolism during 36- and 60-day hypokinesia [NASA-TM-76870] N82-30883

Status and prospects of research on biological and therapeutic effects of magnetic fields N82-30901

Mechanism of biological effects of magnetic fields N82-30903

Effects of low-frequency (50 Hz) electric fields on animals of different ages N82-30910

Meteorological radar as source of SHF electromagnetic field energy and problems of environmental hygiene N82-30911

Effects of microwave radiation on mouse hemopoietic stem cells and on animal resistance to ionizing radiation N82-30912

Main directions of Soviet research on biological effects of microwave radiation N82-30914

Cytogenetic and gonadotoxic effects of static electric fields N82-30915

Effects of superhigh frequency electromagnetic fields on animals of different ages N82-30916

Efficacy of cimetidine in the prevention of ulcer formation in the stomach during immobilization stress [NASA-TM-76864] N82-30923

USSR report: Space Biology and Aerospace Medicine, volume 16, no. 4, July - August 1982 [JPBS-81599] N82-31982

Effects of +G sub x acceleration and adeutron on nuclei acid content and other parameters of mouse peripheral blood N82-31909

Aerospace Medicine and Biology: A continuing bibliography with indexes [NASA-SP-7011(234)] N82-31922

BIOLOGICAL MODELS (MATHEMATICS)

An examination of heat exchanges in man - Establishment of a reference technique for measuring average cutaneous temperatures using infrared thermometry --- French thesis A82-42080

An analysis and modeling of the binocular system in human sagittal vision --- French thesis A82-42090

Analysis of load characteristics and development of new indicators of cardiac function A82-42606

Computer simulation of respiratory control system A82-43145

Threshold models of spatial vision A82-43230

BIOLOGY

Aerospace Medicine and Biology: A continuing bibliography with indexes [NASA-SP-7011(234)] N82-31922

BIOMAGNETISM

Possible adaptation to strong magnetic fields --- by animals [IAP PAPER 82-188] A82-44690

BIOMEDICAL DATA

Principles of biological and medical climatology --- Russian book A82-42065

Diagnostic use of enzymatic test in experiments on monkeys N82-31915

Continuous ECG registration according to the Holter method N82-31934

BIOMETRICS

Percutaneous measurement of partial oxygen tension and local blood flow in man during orthostatic test N82-31904

Diagnostic use of enzymatic test in experiments on monkeys N82-31915

The advantage of the tilt table test in examining circulatory function N82-31941

BIONICS

Computer simulation of respiratory control system A82-43145

USSR report. Life sciences: Biomedical and behavioral sciences, no. 19 [JPBS-81442] N82-30935

BIOSATELLITES

Catecholamines and their enzymes in discrete brain areas of rats after space flight on biosatellites Cosmos [IAP PAPER 82-180] A82-44688

BIOSYNTHESIS

The effect of a physiological load on the exchange and phosphorylation of cell membrane proteins in the brain of rats A82-43654

Polyamines and plant stress - Activation of putrescine biosynthesis by osmotic shock A82-44450

BIOTECHNOLOGY

The role of antagonist coactivation in the control of natural movement N82-30867

USSR report. Life sciences: Biomedical and behavioral sciences, no. 19 [JPBS-81442] N82-30935

BLOCKING

Microcirculatory state in the case of chronic obliteration of arteries A82-42626

BLOOD

Changes in the transaminase activity and several biochemical blood values in the acute period of experimental myocardial infarction in monkeys A82-42172

The interrelationship of the function of the blood kallikrein-kinin system with the main parameters of central hemodynamics during hypertension A82-42175

Some potential blood flow experiments for space [UR-3490-1720] N82-32068

BLOOD CIRCULATION

Features and variations of the local hematocrit A82-42601

Blood circulation and aging A82-42609

Biomicroscopy of a microcirculatory bed in experiments - Possibilities, limitations, and prospects A82-42611

Microcirculation during acute blood loss and hypoxia A82-42997

Liver microcirculation in normoxia and hypoxia A82-43638

Regional redistributions of the blood in blood loss and mechanical trauma against the background of various functional states of the body [NASA-TM-76880] N82-30872

Dehydration therapy for subjects exposed to simulated spaceflight conditions N82-31897

The advantage of the tilt table test in examining circulatory function N82-31941

Some potential blood flow experiments for space [UR-3490-1720] N82-32068

BLOOD COAGULATION

Morphology and coagulant function of human blood system during long exposure to low ammonia concentrations in a sealed environment N82-31903

BLOOD FLOW

Circulation and energetics of forearm muscles in man A82-42604

Effect of exercise conditioning on coronary resistance A82-44139

Percutaneous measurement of partial oxygen tension and local blood flow in man during orthostatic test N82-31904

Noninvasive techniques for cardiovascular examination of interest in aerospace medicine [AGARD-AG-277(PB)] N82-31930

Examining arterial function by Doppler velocimetry. The advantage in aerospace medicine N82-31938

BLOOD PLASMA

Effect of dosed physical loading on plasma and liver lipids and lipoproteins in rats A82-43045

Effect of restricted mobility on the composition and metabolism of blood lipoproteins in rabbits [NASA-TM-76846] N82-30871

Catecholamines in the blood plasma of August and Wistar rats during emotional stress [NASA-TM-76872] N82-30885

Changes of blood plasma renin activity in August and Wistar rats under emotional stress [NASA-TM-76873] N82-30886

Renin-angiotensin-aldosterone system and electrolyte metabolism in rat blood after flight aboard Cosmos-1129 biosatellite N82-31918

Rat blood plasma corticosterone after flight aboard Cosmos-1129 biosatellite N82-31920

BLOOD PRESSURE

A systems analysis of individual vascular reactions in animals under experimentally induced emotional stress A82-42610

The state of hemodynamics under the effect of laser radiation A82-42613

The interrelationship between the pressor response and energy metabolism during isometric muscle contractions A82-43636

Effect of prolonged hypokinesia on resistance of resistive vessels in rats [NASA-TM-76849] N82-30878

Catecholamines in the blood plasma of August and Wistar rats during emotional stress [NASA-TM-76872] N82-30885

Changes of blood plasma renin activity in August and Wistar rats under emotional stress [NASA-TM-76873] N82-30886

BLOOD VESSELS

Features and variations of the local hematocrit A82-42601

The coronary vessels and the contractile apparatus of the myocardium in immune heart damage /Histochemical and ultrastructural studies/ A82-42605

Biomicroscopy of a microcirculatory bed in experiments - Possibilities, limitations, and prospects A82-42611

The responses of the coronary vessels in dogs to hypothalamic stimulation in acute and chronic experiments A82-43634

Conjugated changes of the resistance and blood filling of cerebral vessels during shifts in the blood gas composition A82-43635

The interaction of Purkinje cells, capillaries and glia in the cerebellar cortex of normal and hypokinetic cats [NASA-TM-76882] N82-30873

BLOOD VOLUME

The dynamics of the development of postischemial cerebrovascular phenomena during the perfusion of the cerebral vessels with a stable volume of blood A82-42173

Microcirculation during acute blood loss and hypoxia A82-42997

BLOOD-BRAIN BARRIER

An experimental study of the human blood-cerebral barrier using scanning electron microscopy A82-42638

BODY COMPOSITION (BIOLOGY)

Features and variations of the local hematocrit A82-42601

BODY MEASUREMENT (BIOLOGY)

Morphological features of the individual structure of the human brain A82-42637

BODY TEMPERATURE

The role of the extrapolation and dynamic stereotype in the mechanism of the formation and improvement of adequate motor coordination A82-43651

Head cooling and heat A82-44292

BODY VOLUME (BIOLOGY)

Temperature effects on lung mechanics in air- and liquid-filled rabbit lungs A82-44134

BONE MARROW

Cytogenetic effects of high-energy charged particles N82-31911

BONES

Stereological analysis of rat bone tissue after flight aboard Cosmos-1129 biosatellite N82-31906

BRADYCARDIA

Functional means for the regulation of heart rhythm during burst stimulation of the vagus nerves A82-43632

The participation of the hypothalamus in the regulation of parasympathetic cardiac reflexes in unanesthetized cats A82-43633

BRAIN

Features of information processing in the right and left hemispheres of the human brain /A survey of the literature/ A82-42632

Functional conditions of the brain and cerebral pathology A82-42634

Morphological features of the individual structure of the human brain A82-42637

Catecholamines and their enzymes in discrete brain areas of rats after space flight on biosatellites Cosmos [IAF PAPER 82-180] A82-44688

Effect of immobilization stress on diacyl- and plasmalogen-derivatives of phospholipids in various rat organs and tissues [NASA-TM-76852] N82-30891

Chromatin of rat brain neurons and nucleic acids of muscles as related to localization of decimeter waves during exercise N82-30908

BRAIN CIRCULATION

The dynamics of the development of postischemial cerebrovascular phenomena during the perfusion of the cerebral vessels with a stable volume of blood
A82-42173

Studies directed toward improving hygienic standards pertaining to total-body vibration resulting from heavy moving equipment
A82-42619

A morphological investigation of the regulatory mechanisms of the intracerebral blood circulation
A82-42627

An experimental study of the human blood-cerebral barrier using scanning electron microscopy
A82-42638

Conjugated changes of the resistance and blood filling of cerebral vessels during shifts in the blood gas composition
A82-43635

Regional hemodynamic changes after spaceflights lasting up to eight days
N82-31895

BRAIN DAMAGE

Stereological analysis of interneuronal contacts in the cerebral cortex of rats during the posthypoxic period
A82-42622

Changes of the functional condition of the neocortex during direct application of optical radiation
A82-43655

BRAIN STEM

Brain-stem auditory evoked potentials in persons with normal hearing
A82-43234

BRONCHI

The anatomy and topography of the human bronchopulmonary lymph nodes
A82-42624

BUOYANCY

Space telescope neutral buoyancy simulations: The first two years
[NASA-TM-82485]
N82-30942

C**CAFFINE**

The effect of drugs altering the exchange of cAMP on the bioelectrogenesis of skeletal muscles
A82-43653

CALCIUM METABOLISM

Morphological distinctions of Macaca rhesus monkey thyroid under normal and various types of hypokinetic conditions
N82-31908

CAMERAS

Medical thermography with a pyroelectric vidicon camera
[RSRE-3365]
N82-30921

CANCER

Probabilistic methodology for estimating radiation induced cancer risk
[D882-001474]
N82-31929

CAPILLARIES (ANATOMY)

Biomicroscopy of a microcirculatory bed in experiments - Possibilities, limitations, and prospects
A82-42611

The interaction of Purkinje cells, capillaries and glia in the cerebellar cortex of normal and hypokinetic cats
[NASA-TM-76882]
N82-30873

Changes in transcapillary metabolism in patients with chronic venous insufficiency of legs under influence of static magnetic fields
N82-30907

CARBOHYDRATE METABOLISM

Effects of beta-adrenergic receptor blockade on glycogenolysis during exercise
A82-44133

Regulation of glycogenolysis in human muscle at rest and during exercise
A82-44144

CARBON DIOXIDE

Position paper: The toxic effects of chronic exposure to low levels of carbon dioxide
[AD-A115053]
N82-30930

CARCINOGENS

Biological availability of nickel arsenides: Toxic effects of particulate Ni5As2
[D882-000580]
N82-30932

Investigation on the carcinogenic effect of trichlorethylene by inhalation and mechanisms of metabolic bioactivation
[BMFT-PB-HA-82-007]
N82-30933

CARDIAC AURICLES

The topography of elements of the cardiac conduction system
A82-42625

CARDIAC VENTRICLES

The topography of elements of the cardiac conduction system
A82-42625

Internal stresses and contractility of myocardium
A82-43513

The mechanisms of the development of the cardiogenic vagosympathetic reflexes
A82-43631

Ventricular preexcitation syndromes
N82-31932

CARDIOGRAPHY

Noninvasive techniques for cardiovascular examination of interest in aerospace medicine
[AGARD-AG-277 (FR)]
N82-31930

Cybernetic analysis of cardiac rhythm of Salyut-6 orbital station crew during graded exercise test
N82-32282

CARDIOLOGY

Heart antigens
A82-43666

Effect of prolonged hypokinesia on resistance of resistive vessels in rats
[NASA-TM-76849]
N82-30878

The exercise electrocardiogram
N82-31933

Contribution of nuclear medicine in cardiology
N82-31939

CARDIOVASCULAR SYSTEM

Blood circulation and aging
A82-42609

The condition of the cardiovascular system in air traffic controllers according to data acquired at the workplace
A82-42614

The intracentral connections of the brain structures participating in cardiovascular control
A82-43627

The adaptive control of vegetative processes --- biofeedback control of cardiovascular system
A82-43652

Regional redistributions of the blood in blood loss and mechanical trauma against the background of various functional states of the body
[NASA-TM-76880]
N82-30872

Influence of stress on the blood system reaction in adrenalectomized mice
[NASA-TM-76902]
N82-30877

Reaction of the blood system to single and double effect of a stress agent
[NASA-TM-76866]
N82-30880

Emotional stress as a factor in cardiovascular disturbances
[NASA-TM-76910]
N82-30889

Genetic and individual differences in cardiovascular disturbances of rats during experimental emotional stress
[NASA-TM-76911]
N82-30890

Possible use of magnetobiological effects in neurosurgery
N82-30905

Detailed research plan: Cardiovascular effects of noise
[PB82-163379]
N82-30934

Morphology and coagulant function of human blood system during long exposure to low ammonia concentrations in a sealed environment
N82-31903

Noninvasive techniques for cardiovascular examination of interest in aerospace medicine
[AGARD-AG-277 (FR)]
N82-31930

Principal electrocardiographic anomalies in the evaluation of pilots
N82-31931

The contribution of cardiac mechanograms in the evaluation of pilots N82-31936

Echocardiography in the examination of pilots N82-31937

Ballistocardiography: A noninvasive method moving towards clinical applications N82-31940

The advantage of the lower body negative pressure test in aerospace medicine N82-31942

Techniques for cardiovascular examination in human centrifuges and the principal results obtained N82-31943

Cybernetic analysis of cardiac rhythm of Salyut-6 orbital station crew during graded exercise test N82-32282

CAROTID SINUS BODY

The intracranial connections of the brain structures participating in cardiovascular control A82-43627

CATARACTS

Comparative analysis of the biological effects of electromagnetic radiation. II - Eye damage. Cataractogenesis A82-43222

CATECHOLAMINE

Effects of beta-adrenergic receptor blockade on glycogenolysis during exercise A82-44133

Catecholamines and their enzymes in discrete brain areas of rats after space flight on biosatellites Cosmos [IAF PAPER 82-180] A82-44688

Catecholamines in the blood plasma of August and Wistar rats during emotional stress [NASA-TM-76872] N82-30885

Changes of blood plasma renin activity in August and Wistar rats under emotional stress [NASA-TM-76873] N82-30886

Activity of rat adrenal medulla after flight aboard Cosmos-1129 biosatellite N82-31905

CELLS (BIOLOGY)

The mechanism of the activating effect of anti-cardiac antibodies on the electrical and contractile activity of myocardial cells A82-43665

Glucocorticoid receptors and metabolic disturbances in the (rat) liver and heart during immobilization [NASA-TM-76874] N82-30887

Diffusion mediated localization on membrane surfaces [NASA-CR-166386] N82-31888

Morphological distinctions of Macaca rhesus monkey thyroid under normal and various types of hypokinetic conditions N82-31908

CENTER OF GRAVITY

The relationship between postural components and voluntary movement A82-43239

CENTRAL NERVOUS SYSTEM

Functional conditions of the brain and cerebral pathology A82-42634

Indices of the rat central nervous system metabolism during 36- and 60-day hypokinesia [NASA-TM-76870] N82-30883

Possible use of magnetobiological effects in neurosurgery N82-30905

Main directions of Soviet research on biological effects of microwave radiation N82-30914

Regional hemodynamic changes after spaceflights lasting up to eight days N82-31895

CENTRIFUGING STRESS

Techniques for cardiovascular examination in human centrifuges and the principal results obtained N82-31943

CEREBELLUM

The effect of a physiological load on the exchange and phosphorylation of cell membrane proteins in the brain of rats A82-43654

CEREBRAL CORTEX

Stereological analysis of interneuronal contacts in the cerebral cortex of rats during the posthypoxic period A82-42622

A morphological investigation of the regulatory mechanisms of the intracerebral blood circulation A82-42627

Functional conditions of the brain and cerebral pathology A82-42634

The influence of afferent visual impulses on the morphological and biochemical parameters of the development of the neurons of the visual, motor, and parietal cerebral cortices A82-42636

The morphology of the connections of the cortical vestibular zone --- Russian book A82-43611

Changes of the functional condition of the neocortex during direct application of optical radiation A82-43655

The interaction of Purkinje cells, capillaries and glia in the cerebellar cortex of normal and hypokinetic cats [NASA-TM-76882] N82-30873

Reaction to hypokinesia and hyperkinesia of somatochrome neurons in the motor zone of the cerebral cortex in rabbits [NASA-TM-76885] N82-30925

Significance of magnetic field parameters to change in evoked bioelectric activity of the brain N82-31910

CEREBRAL VASCULAR ACCIDENTS

The dynamics of the development of postischemic cerebrovascular phenomena during the perfusion of the cerebral vessels with a stable volume of blood A82-42173

CEREBROSPINAL FLUID

An experimental study of the human blood-cerebral barrier using scanning electron microscopy A82-42638

CEREBRUM

The dynamics of the development of postischemic cerebrovascular phenomena during the perfusion of the cerebral vessels with a stable volume of blood A82-42173

The organization of the afferent subcortical inputs of the visual region of the cat cerebrum A82-42621

Conjugated changes of the resistance and blood filling of cerebral vessels during shifts in the blood gas composition A82-43635

CHANNELS (DATA TRANSMISSION)

SNLA host-to-host transfer system [DE82-000089] N82-31925

CHARGED PARTICLES

Cytogenetic effects of heavy charged particles of galactic cosmic radiation in experiments aboard Cosmos-1129 biosatellite N82-31912

CHEMICAL EVOLUTION

Laboratory simulation of interstellar chemical evolution A82-41665

Planetary atmospheres and the search for life [IAF PAPER 82-268] A82-44708

CHEMORECEPTORS

Aortic body chemoreceptor responses to dopamine, haloperidol, and pargyline A82-44136

CHLORIDES

Investigation on the carcinogenic effect of trichlorethylene by inhalation and mechanisms of metabolic bioactivation [BMFT-FB-HA-82-007] N82-30933

CHLOROETHYLENE

Investigation on the carcinogenic effect of trichlorethylene by inhalation and mechanisms of metabolic bioactivation [BMFT-FB-HA-82-007] N82-30933

CHOLESTEROL

Effect of restricted mobility on the composition and metabolism of blood lipoproteins in rabbits [NASA-TM-76846] N82-30871

CHOLINERGICS		
The effectiveness of neurohumoral influences on pulmonary circulation	A82-42607	
CIRCADIAN RHYTHMS		
Regulation of circadian rhythmicity	A82-43383	
CIRCULATORY SYSTEM		
Changes in peripheral circulation of limbs during bone regeneration under influence of low-frequency magnetic fields	N82-30906	
The exercise electrocardiogram	N82-31933	
The advantage of the tilt table test in examining circulatory function	N82-31941	
CLASSIFICATIONS		
Classification of pathological states of the stato-kinetic /vestibular/ analyzer	A82-42630	
CLASSIFYING		
Principles of the definition and classification of tissues	A82-42620	
CLEANING		
Biofouling countermeasure evaluations for OTEC heat exchangers [DE82-003918]	N82-30896	
CLINICAL MEDICINE		
Thermography and microwave heating - The design and fabrication of systems intended for biological and medical use --- French thesis	A82-42087	
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 6 [JPBS-81300]	N82-30899	
Efficacy of cimetidine in the prevention of ulcer formation in the stomach during immobilization stress [NASA-TM-76864]	N82-30923	
Effect of optokinetic stimulation on operator's functional state and professional work capacity	N82-31896	
Implantable, remotely-programmable insulin infusion system [DE82-003084]	N82-31927	
Ballistocardiography: A noninvasive method moving towards clinical applications	N82-31940	
CLOSED ECOLOGICAL SYSTEMS		
Algal culture studies related to a Closed Ecological Life Support System (CELSS) [NASA-CR-166375]	N82-30943	
Workshop on Closed System Ecology [NASA-CR-169280]	N82-31887	
CLOUDS		
Aircarion ionizing doses from radioactive dust cloud generated by nuclear burst [AD-A115541]	N82-30929	
COATINGS		
Coatings for the prevention of macrofouling in the OTEC program [DE82-003238]	N82-30897	
COGNITION		
Cognitive performance, sleep quality and mood during deep oxy-helium diving [RNP-1/81]	N82-30920	
COLD ACCLIMATIZATION		
Analysis of methods for evaluating thermal stress --- effects on human beings	A82-42994	
Thermogenesis and muscle activity during the adaptation to cold --- Russian book	A82-43610	
Hormone response of normal and intermittent cold-preadapted humans to continuous cold	A82-44137	
COLD TOLERANCE		
Hormone response of normal and intermittent cold-preadapted humans to continuous cold	A82-44137	
COLOR CODING		
Color coding of information on electronic display devices --- German thesis	A82-41681	
CONFERENCE		
The effects of color and contrast on target recognition performance using monochromatic television displays [AD-A116238]	N82-31946	
COMBAT		
Aerial combat simulation in the U.S. Air Force	A82-42794	
COMFORT		
Vibration and comfort. I - Translational seat vibration	A82-42829	
Vibration and comfort. II - Rotational seat vibration	A82-42830	
Vibration and comfort. III - Translational vibration of the feet and back. IV - Application of experimental results	A82-43674	
COMMAND AND CONTROL		
A command and control device for a man-machine system - Fabrication of a platform and trials --- French thesis	A82-41699	
Proceedings of the Sixteenth Annual Conference on Manual Control [NASA-CR-169243]	N82-30833	
Supervisory control: Problems, theory and experiment for application to human-computer interaction in undersea remote systems [AD-A116236]	N82-31949	
COMPARISON		
A comparison of display formats for the electronic master monitor and advisory display system [AD-A115127]	N82-30946	
COMPUTER ASSISTED INSTRUCTION		
Logistics support productivity improvement	A82-42196	
Training and personnel impact on increased productivity	A82-42230	
COMPUTER NETWORKS		
SNIA host-to-host transfer system [DE82-000089]	N82-31925	
COMPUTER PROGRAMS		
A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limb, head and eyes	N82-30853	
Human factors and robotics: Current status and future prospects [AD-A115042]	N82-30945	
Probabilistic methodology for estimating radiation induced cancer risk [DE82-001474]	N82-31929	
Life-cycle costing of life support equipment [AD-A116404]	N82-31948	
COMPUTER SYSTEMS DESIGN		
Design and evaluation of an onboard computer-based information system for aircraft	A82-44512	
COMPUTER TECHNIQUES		
An on-line procedure for the extraction of acoustically evoked potentials from the electroencephalogram --- German thesis	A82-41688	
Information automation and the Apollo program - A retrospective	A82-44513	
COMPUTERIZED SIMULATION		
Aerial combat simulation in the U.S. Air Force	A82-42794	
Computer simulation of respiratory control system	A82-43145	
CONCENTRATION (COMPOSITION)		
Biological availability of nickel arsenides: Toxic effects of particulate Ni ₅ As ₂ [DE82-000580]	N82-30932	
Epinephrine and norepinephrine concentrations in rat cardiac ventricles and atria after flight aboard Cosmos-1129 biosatellite	N82-31919	
CONFERENCES		
Proceedings of the Sixteenth Annual Conference on Manual Control [NASA-CR-169243]	N82-30833	
Workshop on Closed System Ecology [NASA-CR-169280]	N82-31887	

CONSCIOUSNESS

CONSCIOUSNESS
Systemic mechanisms of human subconscious activity
N82-30938

CONSTRICCTIONS

Effect of prolonged hypokinesia on resistance of resistive vessels in rats
[NASA-TM-76849] N82-30878

CONTACT POTENTIALS

Ear-nose-throat electrodiagnostic device for determining the rheobase of human mucosa and skin
A82-42629

CONTRACTION

An investigation of the mechanical meaning of the surface electromyogram --- French thesis
A82-42078

The coronary vessels and the contractile apparatus of the myocardium in immune heart damage
/Histochemical and ultrastructural studies/
A82-42605

Analysis of load characteristics and development of new indicators of cardiac function
A82-42606

The interrelationship between the pressor response and energy metabolism during isometric muscle contractions
A82-43636

Seismocardiographic evaluation of contractile function of the myocardium of hypokinetic rats
N82-31902

CONTROL SIMULATION

Computer simulation of respiratory control system
A82-43145

Combined discrete network continuous control modelling of operator behavior
N82-30861

CONTROLLABILITY

A model based technique for predicting pilot opinion ratings for large commercial transports
N82-30846

An analytical prediction of pilot ratings utilizing human pilot model
N82-30847

CORIOLIS EFFECT

The dynamics of certain psychophysiological indicators under the cumulative effect of Coriolis accelerations
A82-42995

CORNEA

Cytogenetic effects of high-energy charged particles
N82-31911

CORONARY CIRCULATION

The coronary vessels and the contractile apparatus of the myocardium in immune heart damage
/Histochemical and ultrastructural studies/
A82-42605

The responses of the coronary vessels in dogs to hypothalamic stimulation in acute and chronic experiments
A82-43634

Effect of exercise conditioning on coronary resistance
A82-44139

CORTICOSTEROIDS

The influence of prostaglandins and polyunsaturated fatty acids on the corticosteroid metabolism of normal and spontaneously hypertensive rats
A82-42174

Influence of stress on the blood system reaction in adrenalectomized mice
[NASA-TM-76902] N82-30877

Glucocorticoid receptors and metabolic disturbances in the (rat) liver and heart during immobilization
[NASA-TM-76874] N82-30887

Specific cytoplasmic glucocorticoid receptors of rat liver under conditions of immobilization stress
[NASA-TM-76863] N82-30893

Specific cytoplasmic glucocorticoid receptors of the rat liver during immobilization stress
[NASA-TM-76869] N82-30894

Rat blood plasma corticosterone after flight aboard Cosmos-1129 biosatellite
N82-31920

COSMIC RAYS

Interpretation of Viking biology experiments
A82-43221

SUBJECT INDEX

Cytogenetic effects of heavy charged particles of galactic cosmic radiation in experiments aboard Cosmos-1129 biosatellite
N82-31912

COSMONAUTS

Main directions and principles of psychological expertise of cosmonauts
N82-31893

COST ESTIMATES

Life-cycle costing of life support equipment
[AD-A116404] N82-31948

CYTOGENESIS

Cytogenetic effects of high-energy charged particles
N82-31911

Cytogenetic effects of heavy charged particles of galactic cosmic radiation in experiments aboard Cosmos-1129 biosatellite
N82-31912

CYTOLOGY

The organization of the afferent subcortical inputs of the visual region of the cat cerebrum
A82-42621

CYTOPLASM

Specific cytoplasmic glucocorticoid receptors of rat liver under conditions of immobilization stress
[NASA-TM-76863] N82-30893

Specific cytoplasmic glucocorticoid receptors of the rat liver during immobilization stress
[NASA-TM-76869] N82-30894

D

DATA ACQUISITION

The condition of the cardiovascular system in air traffic controllers according to data acquired at the workplace
A82-42614

A general purpose data acquisition and analysis system for nystagmus and related data
[NASA-CR-167704] N82-30919

DATA BASES

A performance analysis study of a complex G field experiment
N82-30852

DATA PROCESSING

Combined discrete network continuous control modelling of operator behavior
N82-30861

System for automatic analysis of rheoencephalograms
N82-31916

DATA REDUCTION

A general purpose data acquisition and analysis system for nystagmus and related data
[NASA-CR-167704] N82-30919

DECIMETER WAVES

Chromatin of rat brain neurons and nucleic acids of muscles as related to localization of decimeter waves during exercise
N82-30908

DECISION MAKING

Subjective scaling of mental workload in a multi-task environment
N82-30844

A model of human decision making in multiple process monitoring situations
N82-30862

Application of optimal control principles to describe the supervisory control behavior of AAA crew members
N82-30864

DEHYDRATION

Dehydration therapy for subjects exposed to simulated spaceflight conditions
N82-31897

DEMOGRAPHY

USSR report. Life sciences: Biomedical and behavioral sciences, no. 19
[JPRS-81442] N82-30935

DEOXYRIBONUCLEIC ACID

DNA and RNA synthesis in isolated nuclei of rat skeletal muscles during hypodynamia
[NASA-TM-76875] N82-30888

Changes in rat tissue deoxyribonucleoprotein and nucleic acids following flight aboard Cosmos-1129 biosatellite
N82-31907

SUBJECT INDEX**ELECTROCARDIOGRAPHY**

Deoxyribonucleoprotein and nucleic acid content of rat tissues after flight aboard Cosmos-936 biosatellite N82-31921

DETECTION
A model of human decision making in multiple process monitoring situations N82-30862

Investigation of behaviorally modified rats for use in explosives detection systems [AD-A114632] N82-30895

DEUTERON IRRADIATION
Cytogenetic effects of high-energy charged particles N82-31911

DIAGNOSIS
Morphological criteria for diagnosing pathologies of the thymus with myasthenia A82-42633

Diagnostic use of enzymatic test in experiments on monkeys N82-31915

DIASTOLIC PRESSURE
Effect of exercise conditioning on coronary resistance A82-44139

DIFFERENTIATION (BIOLOGY)
New methodological aspects of the investigation of organ specificity of the lymphatic pathways A82-42602

DIFFUSION
Diffusion mediated localization on membrane surfaces [NASA-CR-166386] N82-31888

DISPLAY DEVICES
Color coding of information on electronic display devices --- German thesis A82-41681

Proceedings of the Sixteenth Annual Conference on Manual Control [NASA-CR-169243] N82-30833

A gunner model for an AAA tracking task with interrupted observations N82-30835

The effect of visual information on the manual approach and landing N82-30837

FMP study of pilot workload. Qualification of workload via instrument scan [NASA-CR-169254] N82-30944

A comparison of display formats for the electronic master monitor and advisory display system [AD-A115127] N82-30946

The effects of color and contrast on target recognition performance using monochromatic television displays [AD-A116238] N82-31946

Reading text from visual display units [FOA-C-53006-H2] N82-31951

DIURETICS
The effect of body position and the administration of a diuretic on the water-salt status and the activity of the kidneys A82-43238

DIVING (UNDERWATER)
Cognitive performance, sleep quality and mood during deep oxy-helium diving [RPN-1/81] N82-30920

A Trimix saturation dive to 660 meters: Studies of cognitive performance, mood and sleep quality [RPN-2/82] N82-31923

DOGS
A technique for long-term measurements of thyroid function in beagle dogs using iodine 125 [FOA-A-59003-H3] N82-31890

DOPPLER EFFECT
Examining arterial function by Doppler velocimetry: The advantage in aerospace medicine N82-31938

DRUGS
Current problems in hypobiosis A82-42171

Hemodynamic response to converting enzyme inhibition at rest and exercise in humans A82-44135

Aortic body chemoreceptor responses to dopamine, haloperidol, and pargyline A82-44136

DYNAMIC LOADS
Dynamic preload as an impact protection concept A82-44290

DYNAMIC RESPONSE

The role of antagonist coactivation in the control of natural movement N82-30867

E**ECHOCARDIOGRAPHY**

Echocardiography in the examination of pilots N82-31937

ECOLOGY

USSR report. Life sciences: Biomedical and behavioral sciences, no. 19 [JPRS-81442] N82-30935

EDEMA

Fluid distribution in progressive pulmonary edema: A low-temperature scanning electron microscopy study [DE82-002554] N82-31928

EDUCATION

Variability in human response to whole-body vibration - The effects of instructions A82-43675

EFFERENT NERVOUS SYSTEMS

A morphological investigation of the regulatory mechanisms of the intracerebral blood circulation A82-42627

Neurophysiological mechanisms of the compensation of motor disturbances in the presence of lesions of the pyramid system /An electromyographic analysis/ A82-42635

Sleep and motor activity: Stages of the ontogenetic evolution of the supraspinal motor control in the human sleep cycle --- Russian book A82-43607

The role of the integrity of the central synaptic and direct influences in the regulation of hemodynamics A82-43628

Role of the thyroid gland during adaptation of skeletal muscles to increased motor activity [NASA-TM-76871] N82-30884

USSR report: Space Biology and Aerospace Medicine, volume 16, no. 4, July - August 1982 [JPBS-81599] N82-31892

EJECTION SEATS

Aircrew windblast protection concepts, development and evaluation [AD-A115424] N82-31947

ELECTRIC FIELDS

Effects of low-frequency (50 Hz) electric fields on animals of different ages N82-30910

Cytogenetic and gonadotoxic effects of static electric fields N82-30915

ELECTRIC STIMULI

The effects of the direction of attention on the transmission of cutaneous information --- French thesis A82-42083

Ear-nose-throat electrodiagnostic device for determining the rheobase of human mucosa and skin A82-42629

The intracentral connections of the brain structures participating in cardiovascular control A82-43627

The mechanisms of hypertensive responses during emotional stress A82-43630

Functional means for the regulation of heart rhythm during burst stimulation of the vagus nerves A82-43632

ELECTRICAL IMPEDANCE

The role of antagonist coactivation in the control of natural movement N82-30867

ELECTROCARDIOGRAPHY

Electrocardiographic correlates of emotional stress A82-43236

Comparative evaluation of informativeness of three corrected orthogonal leads and twelve conventional EKG leads in conducting functional tests N82-31914

Principal electrocardiographic anomalies in the evaluation of pilots N82-31931

Ventricular preexcitation syndromes N82-31932

The exercise electrocardiogram N82-31933

Continuous ECG registration according to the Holter method N82-31934

ELECTRODES

Comparative evaluation of informativeness of three corrected orthogonal leads and twelve conventional EKG leads in conducting functional tests N82-31914

ELECTROENCEPHALOGRAPHY

An on-line procedure for the extraction of acoustically evoked potentials from the electroencephalogram --- German thesis A82-41688

ELECTROLYTES

Influence of hypokinesia on the content of electrolytes in animal organs [NASA-TM-76899] N82-30874

Renin-angiotensin-aldosterone system and electrolyte metabolism in rat blood after flight aboard Cosmos-1129 biosatellite N82-31918

ELECTROMAGNETIC FIELDS

Distribution of heat in biological tissues under influence of UHF electromagnetic fields --- for tumor treatment N82-30909

Meteorological radar as source of SHF electromagnetic field energy and problems of environmental hygiene N82-30911

Effects of superhigh frequency electromagnetic fields on animals of different ages N82-30916

Significance of magnetic field parameters to change in evoked bioelectric activity of the brain N82-31910

ELECTROMAGNETIC RADIATION

Comparative analysis of the biological effects of electromagnetic radiation. II - Eye damage. Cataractogenesis A82-43222

USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 6 [JPRS-81300] N82-30899

Stimulating effect of exposure of rat sternum to variable magnetic field on antibody production in the spleen N82-30900

Status and prospects of research on biological and therapeutic effects of magnetic fields N82-30901

ELECTROMYOGRAPHY

An investigation of the mechanical meaning of the surface electromyogram --- French thesis A82-42078

Neurophysiological mechanisms of the compensation of motor disturbances in the presence of lesions of the pyramid system /An electromyographic analysis/ A82-42635

ELECTRON MICROSCOPY

Fluid distribution in progressive pulmonary edema: A low-temperature scanning electron microscopy study [DE82-002554] N82-31928

ELECTRON PARAMAGNETIC RESONANCE

Electron paramagnetic resonance assignment: An analysis of methods used for biological samples [ISS-T-82/2] N82-31889

ELECTRONIC EQUIPMENT

Color coding of information on electronic display devices --- German thesis A82-41681

ELECTRONYSTAGMOGRAPHY

Measurement of vestibular asymmetry in rotation tests N82-31913

EMOTIONAL FACTORS

Emotional stress and hypokinesia in the origination of cardiac disorders and hypertensive states A82-42608

A systems analysis of individual vascular reactions in animals under experimentally induced emotional stress A82-42610

Electrocardiographic correlates of emotional stress A82-43236

The mechanisms of hypertensive responses during emotional stress A82-43630

Biogenic monoamine content of the ganglia in the autonomic nervous system of rabbits during acute experimental emotional stress [NASA-TM-76900] N82-30875

Catecholamines in the blood plasma of August and Wistar rats during emotional stress [NASA-TM-76872] N82-30885

Changes of blood plasma renin activity in August and Wistar rats under emotional stress [NASA-TM-76873] N82-30886

Emotional stress as a factor in cardiovascular disturbances [NASA-TM-76910] N82-30889

Effect of sensitization on development of stress gastric ulcers in rats [NASA-TM-76868] N82-30892

ENDOCRINE GLANDS

A technique for long-term measurements of thyroid function in beagle dogs using iodine 125 [FOA-A-59003-H3] N82-31890

ENDOCRINE SYSTEMS

Individual features in the organization of the human endocrinical system A82-42631

ENVIRONMENT EFFECTS

Meteorological radar as source of SHF electromagnetic field energy and problems of environmental hygiene N82-30911

ENVIRONMENTAL CONTROL

Regenerable life support for the space station - A technology status summary [IAF PAPER 82-45] A82-44658

ENZYME ACTIVITY

Changes in the transaminase activity and several biochemical blood values in the acute period of experimental myocardial infarction in monkeys A82-42172

Effect of dosed physical loading on biological oxidation and bioenergy in liver and myocardium A82-43046

Hemodynamic response to converting enzyme inhibition at rest and exercise in humans A82-44135

Protein kinase activity in liver of heat-acclimated hamsters A82-44145

Catecholamines and their enzymes in discrete brain areas of rats after space flight on biosatellites Cosmos [IAF PAPER 82-180] A82-44688

Diagnostic use of enzymatic test in experiments on monkeys N82-31915

EPINEPHRINE

The effect of drugs altering the exchange of cAMP on the bioelectrogenesis of skeletal muscles A82-43653

EPITHELIUM

Cytogenetic effects of high-energy charged particles N82-31911

ERYTHROCYTES

Effect of hypokinesia on some red blood indices and the condition of regulatory systems [NASA-TM-76752] N82-30918

Effects of +G sub x acceleration and a deuteron on nuclei acid content and other parameters of mouse peripheral blood N82-31909

Some potential blood flow experiments for space [UR-3490-1720] N82-32068

ESTIMATING

Effect of counting and tracking on verbal and production methods of time estimation N82-30845

EVALUATION		
An analytic framework for allocating R and D resources at GRI [PB82-168428]	N82-30898	
EVOKED RESPONSE (PSYCHOPHYSIOLOGY)		
An on-line procedure for the extraction of acoustically evoked potentials from the electroencephalogram --- German thesis	A82-41688	
EXAMINATION		
Preflight examination results used to forecast cosmonaut endurance of orthostatic tests after spaceflight	N82-31917	
EXERCISE PHYSIOLOGY		
The exercise electrocardiogram	N82-31933	
EXOBIOLOGY		
Interpretation of Viking biology experiments	A82-43221	
Planetary atmospheres and the search for life [IAF PAPER 82-268]	A82-44708	
EXPERIMENTAL DESIGN		
A technique for long-term measurements of thyroid function in beagle dogs using iodine 125 [FOA-A-59003-H3]	N82-31890	
EXPLOSIVES		
Investigation of behaviorally modified rats for use in explosives detection systems [AD-A114632]	N82-30895	
EXPOSURE		
Distinctions of nervous system reactions to artificially intensified magnetic fields	N82-30902	
Mechanism of biological effects of magnetic fields	N82-30903	
Possible use of magnetobiological effects in neurosurgery	N82-30905	
Pulmonary function measures before and after exposure of human subjects to +G(z) and +G(x) acceleration loads [AD-A114652]	N82-30928	
EXTRATERRESTRIAL LIFE		
Interpretation of Viking biology experiments	A82-43221	
Planetary atmospheres and the search for life [IAF PAPER 82-268]	A82-44708	
Cooperative effort suggested for research on extraterrestrial life	N82-32284	
EYE DISEASES		
Comparative analysis of the biological effects of electromagnetic radiation. II - Eye damage. Cataractogenesis	A82-43222	
EYE MOVEMENTS		
An analysis and modeling of the binocular system in human sagittal vision --- French thesis	A82-42090	
A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limb, head and eyes	N82-30853	
Effect of optokinetic stimulation on operator's functional state and professional work capacity	N82-31896	
F		
PALLOUT		
Aircrew ionizing doses from radioactive dust cloud generated by nuclear burst [AD-A115541]	N82-30929	
FATTY ACIDS		
The influence of prostaglandins and polyunsaturated fatty acids on the corticosteroid metabolism of normal and spontaneously hypertensive rats	A82-42174	
Effect of dosed physical loading on plasma and liver lipids and lipoproteins in rats	A82-43045	
FAULT TOLERANCE		
Design and evaluation of an onboard computer-based information system for aircraft	A82-44512	
FEASIBILITY ANALYSIS		
An analytic framework for allocating R and D resources at GRI [PB82-168428]	N82-30898	
FEET (ANATOMY)		
Vibration and comfort. III - Translational vibration of the feet and back. IV - Application of experimental results	A82-43674	
FIBER OPTICS		
Optical fiber multiple sensor for gripping complex objects	N82-32298	
FIELD STRENGTH		
Mechanism of biological effects of magnetic fields	N82-30903	
FIGHTER AIRCRAFT		
Aerial combat simulation in the U.S. Air Force	A82-42794	
FIRST AID		
Anesthesia, surgery and resuscitation during manned spaceflights	N82-31894	
FLIGHT CONTROL		
Design and evaluation of an onboard computer-based information system for aircraft	A82-44512	
FLIGHT CREWS		
Procru: A model for analyzing flight crew procedures in approach to landing	N82-30863	
Aircrew ionizing doses from radioactive dust cloud generated by nuclear burst [AD-A115541]	N82-30929	
Aircrew windblast protection concepts, development and evaluation [AD-A115424]	N82-31947	
Life-cycle costing of life support equipment [AD-A116404]	N82-31948	
FLIGHT FITNESS		
Principal electrocardiographic anomalies in the evaluation of pilots	N82-31931	
Ventricular preexcitation syndromes	N82-31932	
The contribution of standard radiography in cardiovascular exploration during the examination of pilots	N82-31935	
The contribution of cardiac mechanograms in the evaluation of pilots	N82-31936	
Echocardiography in the examination of pilots	N82-31937	
Examining arterial function by Doppler velocimetry: The advantage in aerospace medicine	N82-31938	
FLIGHT OPERATIONS		
The airline pilot's view of flight deck workload: A preliminary study using a questionnaire [RAE-TM-FS (B)-465]	N82-31945	
FLIGHT SIMULATORS		
Aerial combat simulation in the U.S. Air Force	A82-42794	
Improved procedures training through use of aids developed from learning guidelines [AD-A113109]	N82-30939	
Prediction of short term tracking tasks using an optimal pilot model [AD-A115543]	N82-30940	
FLIGHT STRESS (BIOLOGY)		
Dynamics of functional state of heavy transport helicopter pilots in the course of flight shift	N82-31900	
FLIGHT TESTS		
The role of the test pilot in flight tests	A82-43329	
FLIGHT TIME		
Dynamics of functional state of heavy transport helicopter pilots in the course of flight shift	N82-31900	
FLIGHT TRAINING		
Improved procedures training through use of aids developed from learning guidelines [AD-A113109]	N82-30939	
FOREARM		
Circulation and energetics of forearm muscles in man	A82-42604	

FORMAT

FORMAT
 A comparison of display formats for the electronic master monitor and advisory display system [AD-A115127] N82-30946

FOULING
 Biofouling countermeasure evaluations for OTEC heat exchangers [DE82-003918] N82-30896

FREEZING
 Electron paramagnetic resonance assignment: An analysis of methods used for biological samples [ISS-T-82/2] N82-31889

FRENCH SPACE PROGRAMS
 The first joint Franco-Soviet manned flight - The posture experiment [IAF PAPER 82-183] A82-44689

FUEL CORROSION
 Biocorrosion --- of aircraft fuel tanks [SNIAS-821-551-105] N82-31891

FUEL TANKS
 Biocorrosion --- of aircraft fuel tanks [SNIAS-821-551-105] N82-31891

G

GAMMA RAYS
 Specificity of ultrastructural changes in rat cardiomyocytes after local gamma-irradiation and hypokinesia [NASA-TM-76853] N82-30882

GANGLIA
 Biogenic monoamine content of the ganglia in the autonomic nervous system of rabbits during acute experimental emotional stress [NASA-TM-76900] N82-30875

GAS MIXTURES
 A Trimix saturation dive to 660 meters: Studies of cognitive performance, mood and sleep quality [RPN-2/82] N82-31923

GAS PRESSURE
 Temperature effects on lung mechanics in air- and liquid-filled rabbit lungs A82-44134

GAS TRANSPORT
 A critical value for O₂ transport in the rat A82-44141

GENETICS
 Genetic and individual differences in cardiovascular disturbances of rats during experimental emotional stress [NASA-TM-76911] N82-30890

Cytogenetic and gonadotoxic effects of static electric fields N82-30915

GLYCOGENS
 Effects of beta-adrenergic receptor blockade on glycogenolysis during exercise A82-44133

Regulation of glycogenolysis in human muscle at rest and during exercise A82-44144

GOONADS
 Cytogenetic and gonadotoxic effects of static electric fields N82-30915

GROUND OPERATIONAL SUPPORT SYSTEM
 Application of optimal control principles to describe the supervisory control behavior of AIA crew members N82-30864

GROUND SUPPORT SYSTEMS
 Logistics support productivity improvement A82-42196

GUNNERY TRAINING
 Prediction of short term tracking tasks using an optimal pilot model [AD-A115543] N82-30940

H

HABITABILITY
 Habitability support for manned missions of space 2000 [IAF PAPER 82-170] A82-44685

SUBJECT INDEX

HAND (ANATOMY)
 A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limb, head and eyes N82-30853

HEAD (ANATOMY)
 Head cooling and heat A82-44292

HEAD MOVEMENT
 A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limb, head and eyes N82-30853

HEALING
 Efficacy of cimetidine in the prevention of ulcer formation in the stomach during immobilization stress [NASA-TM-76864] N82-30923

HEART
 Effect of immobilization stress on diacyl- and plasmalogen-derivatives of phospholipids in various rat organs and tissues [NASA-TM-76852] N82-30891
 The contribution of standard radiography in cardiovascular exploration during the examination of pilots N82-31935

HEART DISEASES
 The coronary vessels and the contractile apparatus of the myocardium in immune heart damage /Histochemical and ultrastructural studies/ A82-42605

Emotional stress and hypokinesia in the origination of cardiac disorders and hypertensive states A82-42608

HEART FUNCTION
 Analysis of load characteristics and development of new indicators of cardiac function A82-42606

Internal stresses and contractility of myocardium A82-43513
 Functional means for the regulation of heart rhythm during burst stimulation of the vagus nerves A82-43632

The participation of the hypothalamus in the regulation of parasympathetic cardiac reflexes in unanesthetized cats A82-43633

Heart antigens A82-43666
 Continuous ECG registration according to the Holter method N82-31934

Ballistocardiography: A noninvasive method moving towards clinical applications N82-31940

HEART MINUTE VOLUME
 The state of hemodynamics under the effect of laser radiation A82-42613

HEART RATE
 Evaluation of the heaviness of physical work with marked nervous-emotional stress A82-43240
 A composite assessment of heart rhythm regulation during dosed functional loads A82-43637

Genetic and individual differences in cardiovascular disturbances of rats during experimental emotional stress [NASA-TM-76911] N82-30890
 Cybernetic analysis of cardiac rhythm of Salyut-6 orbital station crew during graded exercise test N82-32282

HEAT ACCLIMATIZATION
 Methods of human adaptation to heat A82-42993
 Analysis of methods for evaluating thermal stress --- effects on human beings A82-42994

Individual features of the vegetative regulation of body functions during the adaptation of sailors in the tropics A82-42996

Protein kinase activity in liver of heat-acclimated hamsters	A82-44145	The interrelationship between the pressor response and energy metabolism during isometric muscle contractions	A82-43636
HEAT EXCHANGERS		Biofouling countermeasure evaluations for OTEC heat exchangers [DE82-003918]	N82-30896
HEAT MEASUREMENT		An examination of heat exchanges in man - Establishment of a reference technique for measuring average cutaneous temperatures using infrared thermometry --- French thesis	A82-42080
HEAT TOLERANCE		Methods of human adaptation to heat	A82-42993
HELICOPTERS		A comparison of display formats for the electronic master monitor and advisory display system [AD-A115127]	N82-30946
HELIUM		Cognitive performance, sleep quality and mood during deep oxy-helium diving [RNP-1/81]	N82-30920
HELIUM-NEON LASERS		The state of hemodynamics under the effect of laser radiation	A82-42613
HEMATOCRIT RATIO		Features and variations of the local hematocrit	A82-42601
HEMATOPOIESIS		Possible use of magnetobiological effects in neurosurgery	N82-30905
		Effects of microwave radiation on mouse hemopoietic stem cells and on animal resistance to ionizing radiation	N82-30912
HEMATOPOIETIC SYSTEM		The role of the hypophysis in early reaction of hemopoietic organs to stress [NASA-TM-76865]	N82-30924
HEMODYNAMIC RESPONSES		The dynamics of the development of postischemial cerebrovascular phenomena during the perfusion of the cerebral vessels with a stable volume of blood	A82-42173
		The interrelationship of the function of the blood kallikrein-kinin system with the main parameters of central hemodynamics during hypertension	A82-42175
		The effectiveness of neurohumoral influences on pulmonary circulation	A82-42607
		Emotional stress and hypokinesia in the origination of cardiac disorders and hypertensive states	A82-42608
		A systems analysis of individual vascular reactions in animals under experimentally induced emotional stress	A82-42610
		The state of hemodynamics under the effect of laser radiation	A82-42613
		Studies directed toward improving hygienic standards pertaining to total-body vibration resulting from heavy moving equipment	A82-42619
		Microcirculation during acute blood loss and hypoxia	A82-42997
		The intracentral connections of the brain structures participating in cardiovascular control	A82-43627
		The mechanisms of hypertensive responses during emotional stress	A82-43630
		The responses of the coronary vessels in dogs to hypothalamic stimulation in acute and chronic experiments	A82-43634
		Conjugated changes of the resistance and blood filling of cerebral vessels during shifts in the blood gas composition	A82-43635
		The interrelationship between the pressor response and energy metabolism during isometric muscle contractions	A82-43636
		Liver microcirculation in normoxia and hypoxia	A82-43638
		Hemodynamic response to converting enzyme inhibition at rest and exercise in humans	A82-44135
		Hypoxic pulmonary vasoconstriction and the size of hypoxic compartment	A82-44138
		Regional redistributions of the blood in blood loss and mechanical trauma against the background of various functional states of the body [NASA-TM-76880]	N82-30872
		Influence of stress on the blood system reaction in adrenalectomized mice [NASA-TM-76902]	N82-30877
		Reaction of the blood system to single and double effect of a stress agent [NASA-TM-76866]	N82-30880
		Regional hemodynamic changes after spaceflights lasting up to eight days	N82-31895
		Dehydration therapy for subjects exposed to simulated spaceflight conditions	N82-31897
		The advantage of the tilt table test in examining circulatory function	N82-31941
		The advantage of the lower body negative pressure test in aerospace medicine	N82-31942
		HEMODYNAMICS	
		Blood circulation and aging	A82-42609
		The role of the integrity of the central synaptic and direct influences in the regulation of hemodynamics	A82-43628
		Preflight examination results used to forecast cosmonaut endurance of orthostatic tests after spaceflight	N82-31917
		HEMORRHAGES	
		Regional redistributions of the blood in blood loss and mechanical trauma against the background of various functional states of the body [NASA-TM-76880]	N82-30872
		HIGH ALTITUDE BREATHING	
		Factors inducing periodic breathing in humans - A general model	A82-44140
		HISTOCHEMICAL ANALYSIS	
		The organization of the afferent subcortical inputs of the visual region of the cat cerebrum	A82-42621
		Electron paramagnetic resonance assignment: An analysis of methods used for biological samples [ISS-T-82/2]	N82-31889
		HISTOLOGY	
		Principles of the definition and classification of tissues	A82-42620
		The topography of elements of the cardiac conduction system	A82-42625
		HOMEOSTASIS	
		Biomicroscopy of a microcirculatory bed in experiments - Possibilities, limitations, and prospects	A82-42611
		Formation of systemic adaptation reactions in static magnetic fields	N82-30904
		HORMONE METABOLISMS	
		Hormone response of normal and intermittent cold-preadapted humans to continuous cold	A82-44137
		Effect of hypokinesia on some red blood indices and the condition of regulatory systems [NASA-TM-76752]	N82-30918
		HORMONES	
		Activity of rat adrenal medula after flight aboard Cosmos-1129 biosatellite	N82-31905

HOT WEATHER

Individual features of the vegetative regulation of body functions during the adaptation of sailors in the tropics

A82-42996

HUMAN BEHAVIOR

Combined discrete network continuous control modelling of operator behavior

N82-30861

A model of human decision making in multiple process monitoring situations

N82-30862

Procrus: A model for analyzing flight crew procedures in approach to landing

N82-30863

New aspects of functional system theory

N82-30936

Systemic mechanisms of human subconscious activity

N82-30938

HUMAN BEINGS

Morphological features of the individual structure of the human brain

A82-42637

Sleep and motor activity: Stages of the ontogenetic evolution of the supraspinal motor control in the human sleep cycle --- Russian book

A82-43607

Position paper: The toxic effects of chronic exposure to low levels of carbon dioxide [AD-A115053]

N82-30930

HUMAN BODY

An analog tracking filter for a swept-sine human vibration test

A82-41808

Subjective response to whole-body vibration - The effects of posture

A82-42831

HUMAN CENTRIFUGES

Techniques for cardiovascular examination in human centrifuges and the principal results obtained

N82-31943

HUMAN FACTORS ENGINEERING

Vibration and comfort. I - Translational seat vibration

A82-42829

Vibration and comfort. II - Rotational seat vibration

A82-42830

Habitability support for manned missions of space 2000 [IAF PAPER 82-170]

A82-44685

Parametric identification of human operator models

N82-30842

Control of muscle activity in unloaded conditions [NASA-TM-76883]

N82-30927

USSR report. Life sciences: Biomedical and behavioral sciences, no. 19 [JPRS-81442]

N82-30935

Human factors and robotics: Current status and future prospects [AD-A115042]

N82-30945

A comparison of display formats for the electronic master monitor and advisory display system [AD-A115127]

N82-30946

Overview of a procedure for human-reliability analysis [DE81-030816]

N82-30947

Main directions and principles of psychological expertise of cosmonauts

N82-31893

Aircrew windblast protection concepts, development and evaluation [AD-A115424]

N82-31947

HUMAN PATHOLOGY

The anatomy and topography of the human bronchopulmonary lymph nodes

A82-42624

Classification of pathological states of the stato-kinetic /vestibular/ analyzer

A82-42630

Morphological criteria for diagnosing pathologies of the thymus with myasthenia

A82-42633

Functional conditions of the brain and cerebral pathology

A82-42634

Neurophysiological mechanisms of the compensation of motor disturbances in the presence of lesions of the pyramid system /An electromyographic analysis/

A82-42635

HUMAN PERFORMANCE

A command and control device for a man-machine system - Fabrication of a platform and trials --- French thesis

A82-41699

Hemodynamic response to converting enzyme inhibition at rest and exercise in humans

A82-44135

Effect of counting and tracking on verbal and production methods of time estimation

N82-30845

A performance analysis study of a complex G field experiment

N82-30852

Performance tests for repeated measures: Moran and computer batteries [AD-A115068]

N82-30941

Overview of a procedure for human-reliability analysis [DE81-030816]

N82-30947

New look at models of visual performance [DE82-001337]

N82-31924

HUMAN REACTIONS

Variability in human response to whole-body vibration - The effects of instructions

A82-43675

A comprehensive system model for motion/space sickness: Preliminary results

N82-30855

New aspects of functional system theory

N82-30936

Effect of synthesized propeller vibration on passenger annoyance in a turboprop interior noise environment [NASA-TM-84515]

N82-31944

HUMAN TOLERANCES

Studies directed toward improving hygienic standards pertaining to total-body vibration resulting from heavy moving equipment

A82-42619

Methods of human adaptation to heat

A82-42993

Analysis of methods for evaluating thermal stress --- effects on human beings

A82-42994

Hormone response of normal and intermittent cold-preadapted humans to continuous cold

A82-44137

Dynamic preload as an impact protection concept

A82-44290

HYDROXYL COMPOUNDS

Effect of mebicar on animals under extreme conditions [NASA-TM-76851]

N82-30879

HYGIENE

Mental hygiene of sailors --- Russian book

A82-43602

HYPERCAPNIA

Conjugated changes of the resistance and blood filling of cerebral vessels during shifts in the blood gas composition

A82-43635

HYPERKINESIA

Reaction to hypokinesia and hyperkinesia of somatochrome neurons in the motor zone of the cerebral cortex in rabbits [NASA-TM-76885]

N82-30925

HYPEROPIA

Hyperacuity and interpolation by the visual pathways

A82-43100

HYPEROXIA

A critical value for O2 transport in the rat

A82-44141

Hyperoxia inhibits stimulated superoxide release by rat alveolar macrophages

A82-44143

HYPERTENSION

The influence of prostaglandins and polyunsaturated fatty acids on the corticosteroid metabolism of normal and spontaneously hypertensive rats

A82-42174

HYPOMETABOLISM	
Current problems in hypobiosis	A82-42171
HYPOTENSION	
The state of hemodynamics under the effect of laser radiation	A82-42613
HYPOTHALAMUS	
The intracentral connections of the brain structures participating in cardiovascular control	A82-43627
The participation of the hypothalamus in the regulation of parasympathetic cardiac reflexes in unanesthetized cats	A82-43633
The responses of the coronary vessels in dogs to hypothalamic stimulation in acute and chronic experiments	A82-43634
State of the endocrine glands in hypodynamia (A review of the literature)	N82-30926
Significance of magnetic field parameters to change in evoked bioelectric activity of the brain	N82-31910
HYPOTHERMIA	
Current problems in hypobiosis	A82-42171
HYPOKINESIA	
Reaction to hypokinesia and hyperkinesia of somatochrome neurons in the motor zone of the cerebral cortex in rabbits [NASA-TM-76885]	N82-30925
Emotional stress and hypokinesia in the origination of cardiac disorders and hypertensive states	A82-42608
Effect of restricted mobility on the composition and metabolism of blood lipoproteins in rabbits [NASA-TM-76846]	N82-30871
Regional redistributions of the blood in blood loss and mechanical trauma against the background of various functional states of the body [NASA-TM-76880]	N82-30872
The interaction of Purkinje cells, capillaries and glia in the cerebellar cortex of normal and hypokinetic cats [NASA-TM-76882]	N82-30873
Influence of hypokinesia on the content of electrolytes in animal organs [NASA-TM-76899]	N82-30874
Effect of immobilization on the development of experimental arteriosclerosis in rabbits [NASA-TM-76901]	N82-30876
Effect of prolonged hypokinesia on resistance of resistive vessels in rats [NASA-TM-76849]	N82-30878
Reaction of the blood system to single and double effect of a stress agent [NASA-TM-76866]	N82-30880
Specificity of ultrastructural changes in rat cardiomyocytes after local gamma-irradiation and hypokinesia [NASA-TM-76853]	N82-30882
Indices of the rat central nervous system metabolism during 36- and 60-day hypokinesia [NASA-TM-76870]	N82-30883
DNA and RNA synthesis in isolated nuclei of rat skeletal muscles during hypodynamia [NASA-TM-76875]	N82-30888
Specific cytoplasmic glucocorticoid receptors of rat liver under conditions of immobilization stress [NASA-TM-76863]	N82-30893
Specific cytoplasmic glucocorticoid receptors of the rat liver during immobilization stress [NASA-TM-76869]	N82-30894
Effect of hypokinesia on some red blood indices and the condition of regulatory systems [NASA-TM-76752]	N82-30918
RNA accumulation in the body of neurons as an indicator of their functional deafferentation [NASA-TM-76850]	N82-30922
Reaction to hypokinesia and hyperkinesia of somatochrome neurons in the motor zone of the cerebral cortex in rabbits [NASA-TM-76885]	N82-30925
State of the endocrine glands in hypodynamia (A review of the literature)	N82-30926
Seismocardiographic evaluation of contractile function of the myocardium of hypokinetic rats	N82-31902
Morphological distinctions of <i>Macaca rhesus</i> monkey thyroid under normal and various types of hypokinetic conditions	N82-31908
ILLUMINATING	
New look at models of visual performance [DE82-001337]	N82-31924
IMAGE CONTRAST	
Contrast increment thresholds of rhesus monkeys	A82-43099
IMMOBILIZATION	
Effect of immobilization on the development of experimental arteriosclerosis in rabbits [NASA-TM-76901]	N82-30876
Catecholamines in the blood plasma of August and Wistar rats during emotional stress [NASA-TM-76872]	N82-30885
Glucocorticoid receptors and metabolic disturbances in the (rat) liver and heart during immobilization [NASA-TM-76874]	N82-30887
Effect of immobilization stress on diacyl- and plasmalogen-derivatives of phospholipids in various rat organs and tissues [NASA-TM-76852]	N82-30891
IMMUNITY	
The coronary vessels and the contractile apparatus of the myocardium in immune heart damage /Histochemical and ultrastructural studies/	A82-42605
Effect of single exposure to microwaves on quantity and functional properties of T and B lymphocytes of guinea pig and mouse spleen	N82-30913
IMMUNOLOGY	
Heart antigens	A82-43666

IMPACT ACCELERATION**SUBJECT INDEX**

Stimulating effect of exposure of rat sternum to variable magnetic field on antibody production in the spleen N82-30900

IMPACT ACCELERATION
Dynamic preload as an impact protection concept A82-44290

IMPACT RESISTANCE
Dynamic preload as an impact protection concept A82-44290

IMPLANTED ELECTRODES (BIOLOGY)
A cortically implantable multielectrode array for investigating the mammalian visual system [AD-A115484] N82-30931

INDUSTRIAL SAFETY
Studies directed toward improving hygienic standards pertaining to total-body vibration resulting from heavy moving equipment A82-42619

INFLATING
Pulmonary function measures before and after exposure of human subjects to +G(z) and +G(x) acceleration loads [AD-A114652] N82-30928

INFORMATION
Features of information processing in the right and left hemispheres of the human brain /A survey of the literature/ A82-42632

INFORMATION MANAGEMENT
Information automation and the Apollo program - A retrospective A82-44513

INFORMATION RETRIEVAL
A general purpose data acquisition and analysis system for nystagmus and related data [NASA-CR-167704] N82-30919

INFORMATION SYSTEMS
Design and evaluation of an onboard computer-based information system for aircraft A82-44512

INFRARED IMAGERY
Medical thermography with a pyroelectric vidicon camera [BSRE-3365] N82-30921

INFRARED INSTRUMENTS
An examination of heat exchanges in man - Establishment of a reference technique for measuring average cutaneous temperatures using infrared thermometry --- French thesis A82-42080

Medical thermography with a pyroelectric vidicon camera [BSRE-3365] N82-30921

INORGANIC PEROXIDES
Hyperoxia inhibits stimulated superoxide release by rat alveolar macrophages A82-44143

INSTRUMENT LANDING SYSTEMS
FMP study of pilot workload. Qualification of workload via instrument scan [NASA-CR-169254] N82-30944

INSULIN
Implantable, remotely-programmable insulin infusion system [DE82-003084] N82-31927

INTERPROCESSOR COMMUNICATION
SNLA host-to-host transfer system [DE82-000089] N82-31925

INTERSTELLAR CHEMISTRY
Laboratory simulation of interstellar chemical evolution A82-41665

INTRAVENOUS PROCEDURES
Implantable, remotely-programmable insulin infusion system [DE82-003084] N82-31927

IODINE 125
A technique for long-term measurements of thyroid function in beagle dogs using iodine 125 [FOA-A-59003-H3] N82-31890

IONIZING RADIATION
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 6 [JPRS-81300] N82-30899

Effects of microwave radiation on mouse hemopoietic stem cells and on animal resistance to ionizing radiation N82-30912

Aircrew ionizing doses from radioactive dust cloud generated by nuclear burst [AD-A115541] N82-30929

IRRADIATION
Cytogenetic effects of heavy charged particles of galactic cosmic radiation in experiments aboard Cosmos-1129 biosatellite N82-31912

ISCHEMIA
The dynamics of the development of postischemial cerebrovascular phenomena during the perfusion of the cerebral vessels with a stable volume of blood A82-42173

Microcirculatory state in the case of chronic obliteration of arteries A82-42626

Emotional stress as a factor in cardiovascular disturbances [NASA-TM-76910] N82-30889

ISOTOPIC LABELING
Contribution of nuclear medicine in cardiology N82-31939

J

JUDGMENTS
Proceedings of the Sixteenth Annual Conference on Manual Control [NASA-CR-169243] N82-30833

Modelling of human operator dynamics in simple manual control utilizing time series analysis N82-30834

K

KIDNEYS
The effect of body position and the administration of a diuretic on the water-salt status and the activity of the kidneys A82-43238

L

LAKES
Study of the morphological and biological properties of obligate and facultative psychrophilic bacteria found in the Antarctic A82-43671

LANDING
The effect of visual information on the manual approach and landing N82-30837

LANDING SIMULATION
Pilot reaction to attitude gyro failure: A flight experiment N82-30858

Procru: A model for analyzing flight crew procedures in approach to landing N82-30863

LEARNING
Pursuit tracking and higher levels of skill development in the human pilot N82-30839

Systemic mechanisms of human subconscious activity N82-30938

LEARNING THEORY
Training and personnel impact on increased productivity A82-42230

LESIONS
Neurophysiological mechanisms of the compensation of motor disturbances in the presence of lesions of the pyramid system /An electromyographic analysis/ A82-42635

LEUKOCYTES
Effects of +G sub x acceleration and a deuteron on nucleic acid content and other parameters of mouse peripheral blood N82-31909

LIFE CYCLE COSTS
Life-cycle costing of life support equipment [AD-A116404] N82-31948

LIFE SCIENCES
Current problems in hypobiosis A82-42171

LIFE SUPPORT SYSTEMS

Regenerable life support for the space station - A technology status summary
[IAF PAPER 82-45] A82-44658

Algal culture studies related to a Closed Ecological Life Support System (CELSS)
[NASA-CR-166375] N82-30943

Workshop on Closed System Ecology
[NASA-CR-169280] N82-31887

Life-cycle costing of life support equipment
[AD-A116404] N82-31948

LIMBS (ANATOMY)

A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limb, head and eyes
N82-30853

The role of antagonist coactivation in the control of natural movement
N82-30867

LIPID METABOLISM

Activation of lipid peroxidation during stress in man, evaluated according to the content of pentane in expired air
A82-42600

Effect of dosed physical loading on plasma and liver lipids and lipoproteins in rats
A82-43045

Effect of restricted mobility on the composition and metabolism of blood lipoproteids in rabbits [NASA-TM-76846] N82-30871

Effect of immobilization stress on diacyl- and plasmalogen-derivatives of phospholipids in various rat organs and tissues [NASA-TM-76852] N82-30891

LIPOPROTEINS

Effect of dosed physical loading on plasma and liver lipids and lipoproteins in rats
A82-43045

LIQUIDS

Temperature effects on lung mechanics in air- and liquid-filled rabbit lungs
A82-44134

LIVER

Effect of dosed physical loading on plasma and liver lipids and lipoproteins in rats
A82-43045

Effect of dosed physical loading on biological oxidation and bioenergy in liver and myocardium
A82-43046

Liver microcirculation in normoxia and hypoxia
A82-43638

Protein kinase activity in liver of heat-acclimated hamsters
A82-44145

Effect of immobilization stress on diacyl- and plasmalogen-derivatives of phospholipids in various rat organs and tissues [NASA-TM-76852] N82-30891

Specific cytoplasmic glucocorticoid receptors of rat liver under conditions of immobilization stress [NASA-TM-76863] N82-30893

Specific cytoplasmic glucocorticoid receptors of the rat liver during immobilization stress [NASA-TM-76869] N82-30894

LOADS (FORCES)

Analysis of load characteristics and development of new indicators of cardiac function
A82-42606

LOGIC CIRCUITS

A cortically implantable multielectrode array for investigating the mammalian visual system [AD-A115484] N82-30931

LOGISTICS MANAGEMENT

Logistics support productivity improvement
A82-42196

LONG DURATION SPACE FLIGHT

Medical support and technology for long-duration space missions [IAF PAPER 82-174] A82-44687

LONG TERM EFFECTS

Levels of physiological reserves of sailors working a 10-hour shift
A82-42618

LOW FREQUENCIES

Changes in peripheral circulation of limbs during bone regeneration under influence of low-frequency magnetic fields
N82-30906

Effects of low-frequency (50 Hz) electric fields on animals of different ages
N82-30910

LOWER BODY NEGATIVE PRESSURE

The advantage of the lower body negative pressure test in aerospace medicine
N82-31942

LUMINOUS INTENSITY

Mechanisms of the damaging effect of light on retinal photoreceptors
A82-43233

LUNG MORPHOLOGY

The anatomy and topography of the human bronchopulmonary lymph nodes
A82-42624

Temperature effects on lung mechanics in air- and liquid-filled rabbit lungs
A82-44134

LYMPH

New methodological aspects of the investigation of organ specificity of the lymphatic pathways
A82-42602

The contraction, regulation, and functional role of lymph vessels
A82-42603

The anatomy and topography of the human bronchopulmonary lymph nodes
A82-42624

LYMPHOCYTES

Changes in the lymphoid organs of rats under the effect of acute hypoxia
A82-42623

Influence of stress on the blood system reaction in adrenalectomized mice [NASA-TM-76902] N82-30877

Stimulating effect of exposure of rat sternum to variable magnetic field on antibody production in the spleen
N82-30900

Effect of single exposure to microwaves on quantity and functional properties of T and B lymphocytes of guinea pig and mouse spleen
N82-30913

M**MACROPHAGES**

Hyperoxia inhibits stimulated superoxide release by rat alveolar macrophages
A82-44143

MAGNETIC EFFECTS

Possible adaptation to strong magnetic fields --- by animals [IAF PAPER 82-188] A82-44690

MAGNETIC FIELDS

USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 6 [JPBS-81300] N82-30899

Stimulating effect of exposure of rat sternum to variable magnetic field on antibody production in the spleen
N82-30900

Status and prospects of research on biological and therapeutic effects of magnetic fields
N82-30901

Distinctions of nervous system reactions to artificially intensified magnetic fields
N82-30902

Mechanism of biological effects of magnetic fields
N82-30903

Formation of systemic adaptation reactions in static magnetic fields
N82-30904

Possible use of magnetobiological effects in neurosurgery
N82-30905

Changes in peripheral circulation of limbs during bone regeneration under influence of low-frequency magnetic fields
N82-30906

Changes in transcapillary metabolism in patients with chronic venous insufficiency of legs under influence of static magnetic fields
N82-30907

MAGNETOCARDIOGRAPHY

The contribution of standard radiography in cardiovascular exploration during the examination of pilots N82-31935

MAINTAINABILITY

Training and personnel impact on increased productivity A82-42230

MAINTENANCE

Space telescope neutral buoyancy simulations: The first two years [NASA-TM-82485] N82-30942

Life-cycle costing of life support equipment [AD-A116404] N82-31948

MAMMALS

A cortically implantable multielectrode array for investigating the mammalian visual system [AD-A115484] N82-30931

MAN MACHINE SYSTEMS

A command and control device for a man-machine system - Fabrication of a platform and trials --- French thesis A82-41699

Use of physiological information in man-machine systems A82-43388

A finite-state description of coordination in a two-handed target acquisition task A82-44514

A computer simulation approach to measurement of human control strategy N82-30843

Combined discrete network continuous control modelling of operator behavior N82-30861

The role of antagonist coactivation in the control of natural movement N82-30867

A comparison of control modes for time-delayed remote manipulation N82-30868

Experimental evaluation of the concept of supervisory manipulation N82-30869

Supervisory control: Problems, theory and experiment for application to human-computer interaction in undersea remote systems [AD-A116236] N82-31949

The bencil mining system: Progress in two-dimensional simulation of steering characteristics [BR-176] N82-31950

MANAGEMENT METHODS

Application of optimal control principles to describe the supervisory control behavior of AAA crew members N82-30864

MANIPULATORS

The role of antagonist coactivation in the control of natural movement N82-30867

A comparison of control modes for time-delayed remote manipulation N82-30868

MANNED SPACE FLIGHT

Habitability support for manned missions of space 2000 [IAP PAPER 82-170] A82-44685

MANNED SPACECRAFT

Anesthesia, surgery and resuscitation during manned spaceflights N82-31894

MANUAL CONTROL

A finite-state description of coordination in a two-handed target acquisition task A82-44514

Proceedings of the Sixteenth Annual Conference on Manual Control [NASA-CR-169243] N82-30833

Modeling of human operator dynamics in simple manual control utilizing time series analysis N82-30834

A gunner model for an AAA tracking task with interrupted observations N82-30835

The effect of visual information on the manual approach and landing N82-30837

Pursuit tracking and higher levels of skill development in the human pilot N82-30839

An experimental study of human pilot's scanning behavior N82-30841

A computer simulation approach to measurement of human control strategy N82-30843

Subjective scaling of mental workload in a multi-task environment N82-30844

Effect of counting and tracking on verbal and production methods of time estimation N82-30845

A model based technique for predicting pilot opinion ratings for large commercial transports N82-30846

An analytical prediction of pilot ratings utilizing human pilot model N82-30847

A performance analysis study of a complex G field experiment N82-30852

Pilot reaction to attitude gyro failure: A flight experiment N82-30858

Combined discrete network continuous control modelling of operator behavior N82-30861

The role of antagonist coactivation in the control of natural movement N82-30867

A comparison of control modes for time-delayed remote manipulation N82-30868

Experimental evaluation of the concept of supervisory manipulation N82-30869

MARINE ENVIRONMENTS

Coatings for the prevention of macrofouling in the OTEC program [DE82-003238] N82-30897

MARKEt RESEARCH

An analytic framework for allocating R and D resources at GRI [PB82-168428] N82-30898

MARkov PROCESSES

A finite-state description of coordination in a two-handed target acquisition task A82-44514

MARS (PLANET)

Cooperative effort suggested for research on extraterrestrial life N82-32284

MARS SURFACE

Interpretation of Viking biology experiments A82-43221

MATHEMATICAL MODELS

A model based technique for predicting pilot opinion ratings for large commercial transports N82-30846

An analytical prediction of pilot ratings utilizing human pilot model N82-30847

A performance analysis study of a complex G field experiment N82-30852

A model of human decision making in multiple process monitoring situations N82-30862

Procru: A model for analyzing flight crew procedures in approach to landing N82-30863

New look at models of visual performance [DE82-001337] N82-31924

Life-cycle costing of life support equipment [AD-A116404] N82-31948

MECHANOGRAMS

The contribution of cardiac mechanograms in the evaluation of pilots N82-31936

MECHANORECEPTORS

The effects of the direction of attention on the transmission of cutaneous information --- French thesis A82-42083

The mechanisms of the development of the cardiogenic vagosympathetic reflexes	A82-43631	MICROSCOPY
MEDICAL ELECTRONICS		Biomicroscopy of a microcirculatory bed in experiments - Possibilities, limitations, and prospects
Thermography and microwave heating - The design and fabrication of systems intended for biological and medical use --- French thesis	A82-42087	A82-42611
An analysis and modeling of the binocular system in human sagittal vision --- French thesis	A82-42090	Stereological analysis of rat bone tissue after flight aboard Cosmos-1129 biosatellite
Ear-nose-throat electrodiagnostic device for determining the rheobase of human mucosa and skin	A82-42629	N82-31906
MEDICAL EQUIPMENT		MICROWAVE RADIOMETERS
Thermography and microwave heating - The design and fabrication of systems intended for biological and medical use --- French thesis	A82-42087	Thermography and microwave heating - The design and fabrication of systems intended for biological and medical use --- French thesis
Ear-nose-throat electrodiagnostic device for determining the rheobase of human mucosa and skin	A82-42629	A82-42087
Medical support and technology for long-duration space missions [IAF PAPER 82-174]	A82-44687	MICROWAVE SENSORS
USSR report: Space Biology and Aerospace Medicine, volume 16, no. 4, July - August 1982 [JPRS-81599]	N82-31892	Thermography and microwave heating - The design and fabrication of systems intended for biological and medical use --- French thesis
Medical uses of accelerators [DE82-000572]	N82-31926	A82-42087
Implantable, remotely-programmable insulin infusion system [DE82-003084]	N82-31927	MICROWAVES
MEDICAL SERVICES		Effects of microwave radiation on mouse hemopoietic stem cells and on animal resistance to ionizing radiation
Medical support and technology for long-duration space missions [IAF PAPER 82-174]	A82-44687	N82-30912
MEMBRANES		Effect of single exposure to microwaves on quantity and functional properties of T and B lymphocytes of guinea pig and mouse spleen
Diffusion mediated localization on membrane surfaces [NASA-CR-166386]	N82-31888	N82-30913
MENTAL HEALTH		Main directions of Soviet research on biological effects of microwave radiation
Mental hygiene of sailors --- Russian book	A82-43602	N82-30914
MENTAL PERFORMANCE		MINING
Features of information processing in the right and left hemispheres of the human brain /A survey of the literature/	A82-42632	The bench mining system: Progress in two-dimensional simulation of steering characteristics [RR-176]
Subjective scaling of mental workload in a multi-task environment	N82-30844	N82-31950
Controlography used for integral assessment of mental work capacity	N82-31901	MITOCHONDRIA
A Trimix saturation dive to 660 meters: Studies of cognitive performance, mood and sleep quality [RPN-2/82]	N82-31923	Specificity of ultrastructural changes in rat cardiomyocytes after local gamma-irradiation and hypokinesia [NASA-TM-76853]
METABOLISM		N82-30882
The interrelationship between the pressor response and energy metabolism during isometric muscle contractions	A82-43636	MITOSIS
Indices of the rat central nervous system metabolism during 36- and 60-day hypokinesia [NASA-TM-76870]	N82-30883	Changes in the lymphoid organs of rats under the effect of acute hypoxia
Glucocorticoid receptors and metabolic disturbances in the (rat) liver and heart during immobilization [NASA-TM-76874]	N82-30887	A82-42623
Reaction to hypokinesia and hyperkinesia of somatochrome neurons in the motor zone of the cerebral cortex in rabbits [NASA-TM-76885]	N82-30925	MONAURAL SIGNALS
METEOROLOGICAL PARAMETERS		Brain-stem auditory evoked potentials in persons with normal hearing
Principles of biological and medical climatology --- Russian book	A82-42065	A82-43234
METEOROLOGICAL RADAR		MONITORS
Meteorological radar as source of SHF electromagnetic field energy and problems of environmental hygiene	N82-30911	A model of human decision making in multiple process monitoring situations
MICROORGANISMS		N82-30862
Biocorrosion --- of aircraft fuel tanks [SNIAS-821-551-105]	N82-31891	Continuous ECG registration according to the Holter method
Cooperative effort suggested for research on extraterrestrial life	N82-32284	N82-31934
MORPHOLOGY		MOODS
The topography of elements of the cardiac conduction system		Cognitive performance, sleep quality and mood during deep oxy-helium diving [RNP-1/81]
		N82-30920
		A Trimix saturation dive to 660 meters: Studies of cognitive performance, mood and sleep quality [RPN-2/82]
		N82-31923
		MORPHOLOGY
		The influence of afferent visual impulses on the morphological and biochemical parameters of the development of the neurons of the visual, motor, and parietal cerebral cortices
		A82-42636
		Morphological features of the individual structure of the human brain
		A82-42637
		The morphology of the connections of the cortical vestibular zone --- Russian book
		A82-43611
		Morphology and coagulant function of human blood system during long exposure to low ammonia concentrations in a sealed environment
		N82-31903
		Morphological distinctions of Macaca rhesus monkey thyroid under normal and various types of hypokinetic conditions
		N82-31908

MOTION PERCEPTION

MOTION PERCEPTION
 Three stimuli for visual motion perception compared
 A82-42900
 A comprehensive system model for motion/space
 sickness: Preliminary results
 N82-30855
 Effect of optokinetic stimulation on operator's
 functional state and professional work capacity
 N82-31896

MOTION SICKNESS

Medical monitoring and therapy of space motion
 sickness
 [IAF PAPER 82-169] A82-44684
 A comprehensive system model for motion/space
 sickness: Preliminary results
 N82-30855
 Effect of optokinetic stimulation on operator's
 functional state and professional work capacity
 N82-31896

MOTION SIMULATORS

A command and control device for a man-machine
 system - Fabrication of a platform and trials
 --- French thesis
 A82-41699

MOTIVATION

Plastic properties of motivation as prime
 component in systemic organization of purposeful
 behavioral acts
 N82-30937

MOVING TARGET INDICATORS

A finite-state description of coordination in a
 two-handed target acquisition task
 A82-44514

MUSCLES

Regulation of glycogenolysis in human muscle at
 rest and during exercise
 A82-44144

MUSCULAR FUNCTION

An investigation of the mechanical meaning of the
 surface electromyogram --- French thesis
 A82-42078
 Circulation and energetics of forearm muscles in man
 A82-42604
 Physiological mechanisms determining the
 mechanical work of breathing for different types
 of muscular activity
 A82-43237
 The relationship between postural components and
 voluntary movement
 A82-43239
 Thermogenesis and muscle activity during the
 adaptation to cold --- Russian book
 A82-43610
 The interrelationship between the pressor response
 and energy metabolism during isometric muscle
 contractions
 A82-43636
 The role of the extrapolation and dynamic
 stereotype in the mechanism of the formation and
 improvement of adequate motor coordination
 A82-43651
 Role of the thyroid gland during adaptation of
 skeletal muscles to increased motor activity
 [NASA-TM-76871] N82-30884

MUSCULAR STRENGTH

Morphological criteria for diagnosing pathologies
 of the thymus with myasthenia
 A82-42633

Control of muscle activity in unloaded conditions
 [NASA-TM-76883] N82-30927
MUSCULAR TONUS
 Control of muscle activity in unloaded conditions
 [NASA-TM-76883] N82-30927

MUSCULOSKELETAL SYSTEM
 The effect of drugs altering the exchange of cAMP
 on the bioelectrogenesis of skeletal muscles
 A82-43653

Effects of beta-adrenergic receptor blockade on
 glycogenolysis during exercise
 A82-44133

A critical value for O₂ transport in the rat
 A82-44141

The role of antagonist coactivation in the control
 of natural movement
 N82-30867

Role of the thyroid gland during adaptation of
 skeletal muscles to increased motor activity
 [NASA-TM-76871] N82-30884

SUBJECT INDEX

Chromatin of rat brain neurons and nucleic acids
 of muscles as related to localization of
 decimeter waves during exercise
 N82-30908

MYOCARDIAL INFARCTION

Changes in the transaminase activity and several
 biochemical blood values in the acute period of
 experimental myocardial infarction in monkeys
 A82-42172

Emotional stress as a factor in cardiovascular
 disturbances
 [NASA-TM-76910] N82-30889

MYOCARDIUM

The coronary vessels and the contractile apparatus
 of the myocardium in immune heart damage
 /Histochemical and ultrastructural studies/
 A82-42605

Effect of dosed physical loading on biological
 oxidation and bioenergy in liver and myocardium
 A82-43046

Internal stresses and contractility of myocardium
 A82-43513

The mechanism of the activating effect of
 anti-cardiac antibodies on the electrical and
 contractile activity of myocardial cells
 A82-43665

Specificity of ultrastructural changes in rat
 cardiomyocytes after local gamma-irradiation and
 hypokinesia
 [NASA-TM-76853] N82-30882

Seismocardiographic evaluation of contractile
 function of the myocardium of hypokinetic rats
 N82-31902

Epinephrine and norepinephrine concentrations in
 rat cardiac ventricles and atria after flight
 aboard Cosmos-1129 biosatellite
 N82-31919

N**NASA PROGRAMS**

Information automation and the Apollo program - A
 retrospective
 A82-44513

NAVY

Levels of physiological reserves of sailors
 working a 10-hour shift
 A82-42618

NERVOUS SYSTEM

USSR report: Life sciences. Effects of
 nonionizing electromagnetic radiation, no. 6
 [JPRS-81300] N82-30899

Distinctions of nervous system reactions to
 artificially intensified magnetic fields
 N82-30902

NEUROLOGY

Functional conditions of the brain and cerebral
 pathology
 A82-42634

Functional means for the regulation of heart
 rhythm during burst stimulation of the vagus
 nerves
 A82-43632

NEUROMUSCULAR TRANSMISSION

Neurophysiological mechanisms of the compensation
 of motor disturbances in the presence of lesions
 of the pyramid system /An electromyographic
 analysis/
 A82-42635

The role of the integrity of the central synaptic
 and direct influences in the regulation of
 hemodynamics
 A82-43628

NEURONS

The influence of afferent visual impulses on the
 morphological and biochemical parameters of the
 development of the neurons of the visual, motor,
 and parietal cerebral cortices
 A82-42636

The interaction of Purkinje cells, capillaries and
 glia in the cerebellar cortex of normal and
 hypokinetic cats
 [NASA-TM-76882] N82-30873

Biogenic monoamine content of the ganglia in the
 autonomic nervous system of rabbits during acute
 experimental emotional stress
 [NASA-TM-76900] N82-30875

SUBJECT INDEX

Chromatin of rat brain neurons and nucleic acids of muscles as related to localization of decimeter waves during exercise N82-30908

RNA accumulation in the body of neurons as an indicator of their functional deafferentation [NASA-TM-76850] N82-30922

NEUROPHYSIOLOGY

Individual features in the organization of the human endocrinial system A82-42631

Neurophysiological mechanisms of the compensation of motor disturbances in the presence of lesions of the pyramid system /An electromyographic analysis/ A82-42635

Threshold models of spatial vision A82-43230

The morphology of the connections of the cortical vestibular zone --- Russian book A82-43611

USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 6 [JPRS-81300] N82-30899

Mechanism of biological effects of magnetic fields N82-30903

Formation of systemic adaptation reactions in static magnetic fields N82-30904

Possible use of magnetobiological effects in neurosurgery N82-30905

NICKEL COMPOUNDS

Biological availability of nickel arsenides: Toxic effects of particulate Ni5As2 [DE82-000580] N82-30932

NOISE INJURIES

Early clinical manifestations of vibration-noise pathology in miners of Donets Basin A82-42616

NOISE INTENSITY

Experimental study of the combined effect of noise and acetone A82-42612

The effect of general vibration combined with intermittent noise on the human auditory function A82-42615

A physiological justification of allowable noise levels in work involving heavy physical labor under nervous stress A82-42617

NOISE POLLUTION

Detailed research plan: Cardiovascular effects of noise [PB82-163379] N82-30934

NOREPINEPHRINE

Modification of training-induced responses by repeated norepinephrine injections in rats A82-44142

Biogenic monoamine content of the ganglia in the autonomic nervous system of rabbits during acute experimental emotional stress [NASA-TM-76900] N82-30875

Epinephrine and norepinephrine concentrations in rat cardiac ventricles and atria after flight aboard Cosmos-1129 biosatellite N82-31919

NUCLEAR EXPLOSION EFFECT

Aircrew ionizing doses from radioactive dust cloud generated by nuclear burst [AD-A115541] N82-30929

NUCLEAR MEDICINE

USSR report. Life sciences: Biomedical and behavioral sciences, no. 19 [JPRS-81442] N82-30935

NUCLEAR POWER PLANTS

Overview of a procedure for human-reliability analysis [DE81-030816] N82-30947

NUCLEIC ACIDS

DNA and RNA synthesis in isolated nuclei of rat skeletal muscles during hypodynamia [NASA-TM-76875] N82-30888

Chromatin of rat brain neurons and nucleic acids of muscles as related to localization of decimeter waves during exercise N82-30908

ORBITAL SPACE STATIONS

Effects of +G sub x acceleration and adeutron on nuclei acid content and other parameters of mouse peripheral blood N82-31909

NUCLEOTIDES

Changes in rat tissue deoxyribonucleoprotein and nucleic acids following flight aboard Cosmos-1129 biosatellite N82-31907

O

OCCIPITAL LOBES

Psychophysical characteristics of perception and bioelectric activity of the brain during micropolarization of the occipital part of the hemispheres A82-43235

OCEAN THERMAL ENERGY CONVERSION

Biofouling countermeasure evaluations for OTEC heat exchangers [DE82-003918] N82-30896

Coatings for the prevention of macrofouling in the OTEC program [DE82-003238] N82-30897

OLFACTORY PERCEPTION

Investigation of behaviorally modified rats for use in explosives detection systems [AD-A114632] N82-30895

ONBOARD DATA PROCESSING

Design and evaluation of an onboard computer-based information system for aircraft A82-44512

ONTOGENY

Sleep and motor activity: Stages of the ontogenetic evolution of the supraspinal motor control in the human sleep cycle --- Russian book A82-43607

OPERATOR PERFORMANCE

Early clinical manifestations of vibration-noise pathology in miners of Donets Basin A82-42616

Use of physiological information in man-machine systems A82-43388

Controlography used for integral assessment of mental work capacity N82-31901

Reading text from visual display units [FOA-C-53006-H2] N82-31951

OPERATORS (PERSONNEL)

Mental hygiene of sailors --- Russian book A82-43602

Proceedings of the Sixteenth Annual Conference on Manual Control [NASA-CR-169243] N82-30833

Modeling of human operator dynamics in simple manual control utilizing time series analysis N82-30834

Parametric identification of human operator models N82-30842

Human factors and robotics: Current status and future prospects [AD-A115042] N82-30945

OPTICAL ILLUSION

Absence of depth processing in the large-frame rod-and-frame effect --- human space perception A82-44823

Inhibition of the rod-and-frame effect by circular contours --- human depth perception A82-44824

OPTIMAL CONTROL

A model based technique for predicting pilot opinion ratings for large commercial transports N82-30846

Application of optimal control principles to describe the supervisory control behavior of AAA crew members N82-30864

OPTIMIZATION

Prediction of short term tracking tasks using an optimal pilot model [AD-A115543] N82-30940

ORBITAL SPACE STATIONS

Regenerable life support for the space station - A technology status summary [IAF PAPER 82-45] A82-44658

ORGANIZING**SUBJECT INDEX****ORGANIZING**

Individual features in the organization of the human endocrinial system

A82-42631

ORGANS

New methodological aspects of the investigation of organ specificity of the lymphatic pathways

A82-42602

Influence of hypokinesia on the content of electrolytes in animal organs [NASA-TM-76899]

N82-30874

ORTHOSTATIC TOLERANCE

The effect of body position and the administration of a diuretic on the water-salt status and the activity of the kidneys

A82-43238

Percutaneous measurement of partial oxygen tension and local blood flow in man during orthostatic test

N82-31904

OSMOSIS

Polyamines and plant stress - Activation of putrescine biosynthesis by osmotic shock

A82-44450

Dehydration therapy for subjects exposed to simulated spaceflight conditions

N82-31897

OTOLARYNGOLOGY

Characteristics of pharmacotherapeutic complications in otolaryngology /Review of the literature/

A82-42628

Ear-nose-throat electrodiagnostic device for determining the rheobase of human mucosa and skin

A82-42629

OXIDATION

Effect of dosed physical loading on biological oxidation and bioenergy in liver and myocardium

A82-43046

OXYMETRY

Percutaneous measurement of partial oxygen tension and local blood flow in man during orthostatic test

N82-31904

OXYGEN

Cognitive performance, sleep quality and mood during deep oxy-helium diving [RNP-1/81]

N82-30920

OXYGEN CONSUMPTION

A critical value for O₂ transport in the rat

A82-44141

The exercise electrocardiogram

N82-31933

OXYGEN METABOLISM

Effect of dosed physical loading on biological oxidation and bioenergy in liver and myocardium

A82-43046

OXYGEN TENSION

Percutaneous measurement of partial oxygen tension and local blood flow in man during orthostatic test

N82-31904

P**PAIN**

Activation of the cerebral gba-ergic inhibiting system in stress [NASA-TM-76867]

N82-30881

PAPERS

Some potential blood flow experiments for space [UR-3490-1720]

N82-32068

PARAMETERIZATION

Parametric identification of human operator models

N82-30842

PARTICLE ACCELERATORS

Medical uses of accelerators [DE82-000572]

N82-31926

PARTITIONS (MATHEMATICS)

Geometrical considerations in the separation of biological particles by affinity partitioning

N82-32069

PATHOGENESIS

Functional conditions of the brain and cerebral pathology

A82-42634

Comparative analysis of the biological effects of electromagnetic radiation. II - Eye damage. Cataractogenesis

A82-43222

PATHOLOGICAL EFFECTS

Early clinical manifestations of vibration-noise pathology in miners of Donets Basin

A82-42616

Comparative analysis of the biological effects of electromagnetic radiation. II - Eye damage. Cataractogenesis

A82-43222

Mechanisms of the damaging effect of light on retinal photoreceptors

A82-43233

PATTERN RECOGNITION

Performance tests for repeated measures: Moran and computer batteries [AD-A115068]

N82-30941

PATTERN REGISTRATION

A comparison of display formats for the electronic master monitor and advisory display system [AD-A115127]

N82-30946

PENTANES

Activation of lipid peroxidation during stress in man, evaluated according to the content of pentane in expired air

A82-42600

PEPTIDES

An analysis of the role of endogenous opioid peptides in experimental hypertension

A82-43629

PERFORMANCE PREDICTION

Contrography used for integral assessment of mental work capacity

N82-31901

PERIPHERAL CIRCULATION

Microcirculatory state in the case of chronic obliteration of arteries

A82-42626

Changes in peripheral circulation of limbs during bone regeneration under influence of low-frequency magnetic fields

N82-30906

Changes in transcapillary metabolism in patients with chronic venous insufficiency of legs under influence of static magnetic fields

N82-30907

PERMEABILITY

Biomicroscopy of a microcirculatory bed in experiments - Possibilities, limitations, and prospects

A82-42611

PERSONALITY TESTS

Main directions and principles of psychological expertise of cosmonauts

N82-31893

PERSONNEL MANAGEMENT

Training and personnel impact on increased productivity

A82-42230

PERSONNEL SELECTION

Use of physiological information in man-machine systems

A82-43388

Main directions and principles of psychological expertise of cosmonauts

N82-31893

PHARMACOLOGY

Characteristics of pharmacotherapeutic complications in otolaryngology /Review of the literature/

A82-42628

PHONOCARDIOGRAPHY

The contribution of cardiac mechanograms in the evaluation of pilots

N82-31936

PHOSPHORYLATION

The effect of a physiological load on the exchange and phosphorylation of cell membrane proteins in the brain of rats

A82-43654

PHOTOMICROGRAPHY

New methodological aspects of the investigation of organ specificity of the lymphatic pathways

A82-42602

PHOTORECEPTORS

Mechanisms of the damaging effect of light on
retinal photoreceptors A82-43233

PHYSICAL EXAMINATIONS

Noninvasive techniques for cardiovascular
examination of interest in aerospace medicine
[AGARD-AG-277(FR)] N82-31930

Principal electrocardiographic anomalies in the
evaluation of pilots N82-31931

Ventricular preexcitation syndromes N82-31932
The exercise electrocardiogram N82-31933

Continuous ECG registration according to the
Holter method N82-31934

The contribution of standard radiography in
cardiovascular exploration during the
examination of pilots N82-31935

The contribution of cardiac mechanograms in the
evaluation of pilots N82-31936

Echocardiography in the examination of pilots N82-31937

Examining arterial function by Doppler
velocimetry: The advantage in aerospace medicine
N82-31938

Contribution of nuclear medicine in cardiology
N82-31939

Ballistocardiography: A nonintrusive method
moving towards clinical applications
N82-31940

The advantage of the tilt table test in examining
circulatory function N82-31941

The advantage of the lower body negative pressure
test in aerospace medicine N82-31942

Techniques for cardiovascular examination in human
centrifuges and the principal results obtained
N82-31943

PHYSICAL EXERCISE

Circulation and energetics of forearm muscles in man
A82-42604

Effect of dosed physical loading on plasma and
liver lipids and lipoproteins in rats A82-43045

Effect of dosed physical loading on biological
oxidation and bioenergy in liver and myocardium
A82-43046

The effect of a physiological load on the exchange
and phosphorylation of cell membrane proteins in
the brain of rats A82-43654

Effects of beta-adrenergic receptor blockade on
glycogenolysis during exercise A82-44133

Hemodynamic response to converting enzyme
inhibition at rest and exercise in humans
A82-44135

Effect of exercise conditioning on coronary
resistance A82-44139

Modification of training-induced responses by
repeated norepinephrine injections in rats
A82-44142

Regulation of glycogenolysis in human muscle at
rest and during exercise A82-44144

Effect of heat stress on cutaneous vascular
responses to the initiation of exercise
A82-44146

Chromatin of rat brain neurons and nucleic acids
of muscles as related to localization of
decimeter waves during exercise N82-30908

Control of muscle activity in unloaded conditions
[NASA-TM-76883] N82-30927

Cybernetic analysis of cardiac rhythm of Salyut-6
orbital station crew during graded exercise test
N82-32282

Combined rehabilitation and therapeutic measures
in space medicine N82-32283

PHYSICAL FITNESS

Levels of physiological reserves of sailors
working a 10-hour shift A82-42618

PHYSICAL WORK

A physiological justification of allowable noise
levels in work involving heavy physical labor
under nervous stress A82-42617

Physiological mechanisms determining the
mechanical work of breathing for different types
of muscular activity A82-43237

Evaluation of the heaviness of physical work with
marked nervous-emotional stress A82-43240

A composite assessment of heart rhythm regulation
during dosed functional loads A82-43637

The role of the extrapolation and dynamic
stereotype in the mechanism of the formation and
improvement of adequate motor coordination
A82-43651

PHYSIOCHEMISTRY

Current problems in hypobiosis A82-42171

An analysis of the role of endogenous opioid
peptides in experimental hypertension A82-43629

A technique for long-term measurements of thyroid
function in beagle dogs using iodine 125
[FOA-A-59003-H3] N82-31890

PHYSIOLOGICAL ACCELERATION

The dynamics of certain psychophysiological
indicators under the cumulative effect of
Coriolis accelerations A82-42995

PHYSIOLOGICAL DEFENSES

USSR report: Life sciences. Effects of
nonionizing electromagnetic radiation, no. 6
[JPRS-81300] N82-30899

PHYSIOLOGICAL EFFECTS

Experimental study of the combined effect of noise
and acetone A82-42612

The condition of the cardiovascular system in air
traffic controllers according to data acquired
at the workplace A82-42614

A physiological justification of allowable noise
levels in work involving heavy physical labor
under nervous stress A82-42617

Changes in the lymphoid organs of rats under the
effect of acute hypoxia A82-42623

Characteristics of pharmacotherapeutic
complications in otolaryngology /Review of the
literature/ A82-42628

The influence of afferent visual impulses on the
morphological and biochemical parameters of the
development of the neurons of the visual, motor,
and parietal cerebral cortices A82-42636

Analysis of methods for evaluating thermal stress
--- effects on human beings A82-42994

Microcirculation during acute blood loss and hypoxia
A82-42997

An analysis of the role of endogenous opioid
peptides in experimental hypertension A82-43629

The responses of the coronary vessels in dogs to
hypothalamic stimulation in acute and chronic
experiments A82-43634

The effect of drugs altering the exchange of cAMP
on the bioelectrogenesis of skeletal muscles
A82-43653

The effect of a physiological load on the exchange
and phosphorylation of cell membrane proteins in
the brain of rats A82-43654

Changes of the functional condition of the
neocortex during direct application of optical
radiation A82-43655

Vibration and comfort. III - Translational vibration of the feet and back. IV - Application of experimental results A82-43674

Effects of beta-adrenergic receptor blockade on glycogenolysis during exercise A82-44133

Temperature effects on lung mechanics in air- and liquid-filled rabbit lungs A82-44134

Effect of exercise conditioning on coronary resistance A82-44139

A critical value for O₂ transport in the rat A82-44141

Modification of training-induced responses by repeated norepinephrine injections in rats A82-44142

Hyperoxia inhibits stimulated superoxide release by rat alveolar macrophages A82-44143

Regulation of glycogenolysis in human muscle at rest and during exercise A82-44144

Head cooling and heat A82-44292

A comprehensive system model for motion/space sickness: Preliminary results N82-30855

Regional redistributions of the blood in blood loss and mechanical trauma against the background of various functional states of the body [NASA-TM-76880] N82-30872

Status and prospects of research on biological and therapeutic effects of magnetic fields N82-30901

Distinctions of nervous system reactions to artificially intensified magnetic fields N82-30902

Position paper: The toxic effects of chronic exposure to low levels of carbon dioxide [AD-A115053] N82-30930

Biological availability of nickel arsenides: Toxic effects of particulate Ni₅As₂ [DE82-000580] N82-30932

Detailed research plan: Cardiovascular effects of noise [PB82-163379] N82-30934

Anesthesia, surgery and resuscitation during manned spaceflights N82-31894

Regional hemodynamic changes after spaceflights lasting up to eight days N82-31895

Effect of optokinetic stimulation on operator's functional state and professional work capacity N82-31896

Stereological analysis of rat bone tissue after flight aboard Cosmos-1129 biosatellite N82-31906

Changes in rat tissue deoxyribonucleoprotein and nucleic acids following flight aboard Cosmos-1129 biosatellite N82-31907

PHYSIOLOGICAL FACTORS

Use of physiological information in man-machine systems A82-43388

PHYSIOLOGICAL RESPONSES

An on-line procedure for the extraction of acoustically evoked potentials from the electroencephalogram --- German thesis A82-41688

Subjective response to whole-body vibration - The effects of posture A82-42831

Individual features of the vegetative regulation of body functions during the adaptation of sailors in the tropics A82-42996

Brain-stem auditory evoked potentials in persons with normal hearing A82-43234

Electrocardiographic correlates of emotional stress A82-43236

Physiological mechanisms determining the mechanical work of breathing for different types of muscular activity A82-43237

Thermogenesis and muscle activity during the adaptation to cold --- Russian book A82-43610

The mechanisms of the development of the cardiogenic vagosympathetic reflexes A82-43631

Functional means for the regulation of heart rhythm during burst stimulation of the vagus nerves A82-43632

Variability in human response to whole-body vibration - The effects of instructions A82-43675

Aortic body chemoreceptor responses to dopamine, haloperidol, and pargyline A82-44136

Hormone response of normal and intermittent cold-preadapted humans to continuous cold A82-44137

Factors inducing periodic breathing in humans - A general model A82-44140

Protein kinase activity in liver of heat-acclimated hamsters A82-44145

Effect of heat stress on cutaneous vascular responses to the initiation of exercise A82-44146

Proceedings of the Sixteenth Annual Conference on Manual Control [NASA-CR-169243] N82-30833

PHYSIOLOGICAL TESTS

Levels of physiological reserves of sailors working a 10-hour shift A82-42618

Dynamic preload as an impact protection concept A82-44290

Cybernetic analysis of cardiac rhythm of Salyut-6 orbital station crew during graded exercise test N82-32282

PHYSIOLOGY

Regulation of circadian rhythmicity A82-43383

USSR report. Life sciences: Biomedical and behavioral sciences, no. 19 [JPURS-81442] N82-30935

Diffusion mediated localization on membrane surfaces [NASA-CR-166386] N82-31888

PILOT PERFORMANCE

The role of the test pilot in flight tests A82-43329

Proceedings of the Sixteenth Annual Conference on Manual Control [NASA-CR-169243] N82-30833

Modelling of human operator dynamics in simple manual control utilizing time series analysis N82-30834

A gunner model for an AAA tracking task with interrupted observations N82-30835

Pursuit tracking and higher levels of skill development in the human pilot N82-30839

An experimental study of human pilot's scanning behavior N82-30841

Modeling lateral acceleration effects on pilot performance N82-30854

Pilot reaction to attitude gyro failure: A flight experiment N82-30858

Procrut: A model for analyzing flight crew procedures in approach to landing N82-30863

Prediction of short term tracking tasks using an optimal pilot model [AD-A115543] N82-30940

FMP study of pilot workload. Qualification of workload via instrument scan [NASA-CR-169254] N82-30944

Dynamics of functional state of heavy transport helicopter pilots in the course of flight shift N82-31900

The airline pilot's view of flight deck workload: A preliminary study using a questionnaire [RAE-TM-FS(B)-465]	N82-31945	PROFILE METHOD (FORECASTING)	An analytic framework for allocating R and D resources at GRI [PB82-168428]	N82-30898
PILOT TRAINING		PROGRAMMED INSTRUCTION	Implantable, remotely-programmable insulin infusion system [DE82-003084]	N82-31927
A command and control device for a man-machine system - Fabrication of a platform and trials --- French thesis	A82-41699	PROPELLERS	Effect of synthesized propeller vibration on passenger annoyance in a turboprop interior noise environment [NASA-TM-84515]	N82-31944
Aerial combat simulation in the U.S. Air Force	A82-42794	PROSTAGLANDINS	The influence of prostaglandins and polyunsaturated fatty acids on the corticosteroid metabolism of normal and spontaneously hypertensive rats	A82-42174
PITUITARY GLAND		PROTECTION	Aircrew windblast protection concepts, development and evaluation [AD-A115424]	N82-31947
The role of the hypophysis in early reaction of hemopoietic organs to stress [NASA-TM-76865]	N82-30924	PROTEIN METABOLISM	Circulation and energetics of forearm muscles in man A82-42604	
PITUITARY HORMONES			The effect of a physiological load on the exchange and phosphorylation of cell membrane proteins in the brain of rats A82-43654	
Activation of the cerebral gba-ergic inhibiting system in stress [NASA-TM-76867]	N82-30881	PROTEINS	Diffusion mediated localization on membrane surfaces [NASA-CR-166386]	N82-31888
PLANETARY ATMOSPHERES			Deoxyribonucleoprotein and nucleic acid content of rat tissues after flight aboard Cosmos-936 biosatellite N82-31921	
Planetary atmospheres and the search for life [IAF PAPER 82-268]	A82-44708	PROTON IRRADIATION	Cytogenetic effects of high-energy charged particles N82-31911	
PLANT STRESS		PSYCHOLOGICAL EFFECTS	Evaluation of the heaviness of physical work with marked nervous-emotional stress A82-43240	
Polyamines and plant stress - Activation of putrescine biosynthesis by osmotic shock	A82-44450		Variability in human response to whole-body vibration - The effects of instructions A82-43675	
POLARIZATION (CHARGE SEPARATION)			Activation of the cerebral gba-ergic inhibiting system in stress [NASA-TM-76867]	N82-30881
Psychophysical characteristics of perception and bioelectric activity of the brain during micropolarization of the occipital part of the hemispheres	A82-43235		USSR report: Space Biology and Aerospace Medicine, volume 16, no. 4, July - August 1982 [JPRS-81599]	N82-31892
POSITION (LOCATION)			Main directions and principles of psychological expertise of cosmonauts N82-31893	
Diffusion mediated localization on membrane surfaces [NASA-CR-166386]	N82-31888	PSYCHOLOGICAL FACTORS	Subjective response to whole-body vibration - The effects of posture A82-42831	
POSTURE			Use of physiological information in man-machine systems A82-43388	
Subjective response to whole-body vibration - The effects of posture	A82-42831		A comprehensive system model for motion/space sickness: Preliminary results N82-30855	
The effect of body position and the administration of a diuretic on the water-salt status and the activity of the kidneys	A82-43238		Reading text from visual display units [FOA-C-53006-82]	N82-31951
The relationship between postural components and voluntary movement	A82-43239	PSYCHOLOGICAL TESTS	Subjective scaling of mental workload in a multi-task environment N82-30844	
The first joint Franco-Soviet manned flight - The posture experiment [IAF PAPER 82-183]	A82-44689	PSYCHOLOGY	USSR report. Life sciences: Biomedical and behavioral sciences, no. 19 [JPRS-81442]	N82-30935
PREDICTION ANALYSIS TECHNIQUES			New aspects of functional system theory N82-30936	
A model based technique for predicting pilot opinion ratings for large commercial transports	N82-30846		Plastic properties of motivation as prime component in systemic organization of purposeful behavioral acts N82-30937	
An analytical prediction of pilot ratings utilizing human pilot model	N82-30847	PSYCHOMETRICS	New aspects of functional system theory N82-30936	
PREDICTIONS				
Preflight examination results used to forecast cosmonaut endurance of orthostatic tests after spaceflight	N82-31917			
PRESSURE SUITS				
Pulmonary function measures before and after exposure of human subjects to +G(z) and +G(x) acceleration loads [AD-A114652]	N82-30928			
PROBABILITY THEORY				
Probabilistic methodology for estimating radiation induced cancer risk [DE82-001474]	N82-31929			
PROCEDURES				
Improved procedures training through use of aids developed from learning guidelines [AD-A113109]	N82-30939			
Overview of a procedure for human-reliability analysis [DE81-030816]	N82-30947			
PROCEEDINGS				
Some potential blood flow experiments for space [UR-3490-1720]	N82-32068			
PRODUCT DEVELOPMENT				
The role of the test pilot in flight tests	A82-43329			
PRODUCTIVITY				
Logistics support productivity improvement	A82-42196			
Training and personnel impact on increased productivity	A82-42230			

PSYCHOMOTOR PERFORMANCE

A finite-state description of coordination in a two-handed target acquisition task

A82-44514

PSYCHOPHYSICS

Psychophysical characteristics of perception and bioelectric activity of the brain during micropolarization of the occipital part of the hemispheres

A82-43235

PSYCHOPHYSIOLOGY

The effects of the direction of attention on the transmission of cutaneous information --- French thesis

A82-42083

The dynamics of certain psychophysiological indicators under the cumulative effect of Coriolis accelerations

A82-42995

Threshold models of spatial vision

A82-43230

Dynamics of the process of the determination of orientation by man

A82-43231

Electrocardiographic correlates of emotional stress

A82-43236

Mental hygiene of sailors --- Russian book

A82-43602

Psychophysiological performance examination onboard the orbital complex Salyut-Soyuz [IAF PAPER 82-171]

A82-44686

Systemic mechanisms of human subconscious activity

N82-30938

PSYCHROPHILES

Study of the morphological and biological properties of obligate and facultative psychrophilic bacteria found in the Antarctic

A82-43671

PULMONARY CIRCULATION

The effectiveness of nauchumoral influences on pulmonary circulation

A82-42607

Hypoxic pulmonary vasoconstriction and the size of hypoxic compartment

A82-44138

PULMONARY FUNCTIONS

Pulmonary function measures before and after exposure of human subjects to +G(z) and +G(x) acceleration loads [AD-A114652]

N82-30928

Fluid distribution in progressive pulmonary edema: A low-temperature scanning electron microscopy study [DE82-002554]

N82-31928

PULMONARY LESIONS

The anatomy and topography of the human bronchopulmonary lymph nodes

A82-42624

Factors inducing periodic breathing in humans - A general model

A82-44140

PULSE AMPLITUDE

Electrocardiographic correlates of emotional stress

A82-43236

PULSE RATE

The contribution of cardiac mechanograms in the evaluation of pilots

N82-31936

PURSUIT TRACKING

Prediction of short term tracking tasks using an optimal pilot model [AD-A115543]

N82-30940

PYROELECTRICITY

Medical thermography with a pyroelectric vidicon camera [RSRE-3365]

N82-30921

R

RABBITS

Influence of hypokinesia on the content of electrolytes in animal organs [NASA-TM-76899]

N82-30874

Effect of immobilization on the development of experimental arteriosclerosis in rabbits [NASA-TM-76901]

N82-30876

RADIATION DOSAGE

Mechanism of biological effects of magnetic fields

N82-30903

Effect of single exposure to microwaves on quantity and functional properties of T and B lymphocytes of guinea pig and mouse spleen

N82-30913

Main directions of Soviet research on biological effects of microwave radiation

N82-30914

Aircrew ionizing doses from radioactive dust cloud generated by nuclear burst [AD-A115541]

N82-30929

RADIATION EFFECTS

The state of hemodynamics under the effect of laser radiation

A82-42613

Specificity of ultrastructural changes in rat cardiomyocytes after local gamma-irradiation and hypokinesia [NASA-TM-76853]

N82-30882

RADIATION HAZARDS

Aircrew ionizing doses from radioactive dust cloud generated by nuclear burst [AD-A115541]

N82-30929

RADIATION INJURIES

Comparative analysis of the biological effects of electromagnetic radiation. II - Eye damage. Cataractogenesis

A82-43222

RADIATION TOLERANCE

Effects of microwave radiation on mouse hemopoietic stem cells and on animal resistance to ionizing radiation

N82-30912

RADIOACTIVE ISOTOPES

A technique for long-term measurements of thyroid function in beagle dogs using iodine 125 [FOA-A-59003-H3]

N82-31890

RADIOBIOLOGY

Changes of the functional condition of the neocortex during direct application of optical radiation

A82-43655

RADIOGRAPHY

The contribution of standard radiography in cardiovascular exploration during the examination of pilots

N82-31935

RADIOLOGY

Noninvasive techniques for cardiovascular examination of interest in aerospace medicine [AGARD-AG-277(FR)]

N82-31930

RADIOLYSIS

Interpretation of Viking biology experiments

A82-43221

RATS

Genetic and individual differences in cardiovascular disturbances of rats during experimental emotional stress [NASA-TM-76911]

N82-30890

Investigation of behaviorally modified rats for use in explosives detection systems [AD-A114632]

N82-30895

REACTION TIME

Performance tests for repeated measures: Moran and computer batteries [AD-A115068]

N82-30941

READING

Reading text from visual display units [FOA-C-53006-H2]

N82-31951

REAL TIME OPERATION

A general purpose data acquisition and analysis system for nystagmus and related data [NASA-CR-167704]

N82-30919

RECEPTORS (PHYSIOLOGY)

Glucocorticoid receptors and metabolic disturbances in the (rat) liver and heart during immobilization [NASA-TM-76874]

N82-30887

RECORDING INSTRUMENTS

Medical thermography with a pyroelectric vidicon camera [RSRE-3365]

N82-30921

REDUCED GRAVITY

Some potential blood flow experiments for space [UR-3490-1720]

N82-32068

REFLEXES

The participation of the hypothalamus in the regulation of parasympathetic cardiac reflexes in unanesthetized cats

A82-43633

A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limb, head and eyes	N82-30853	Regulation of glycogenolysis in human muscle at rest and during exercise	A82-44144
REGENERATION (ENGINEERING)		RESUSCITATION	
Regenerable life support for the space station - A technology status summary [IAF PAPER 82-45]	A82-44658	Anesthesia, surgery and resuscitation during manned spaceflights	N82-31894
REGENERATION (PHYSIOLOGY)		RETINA	
Changes in peripheral circulation of limbs during bone regeneration under influence of low-frequency magnetic fields	N82-30906	Mechanisms of the damaging effect of light on retinal photoreceptors	A82-43233
RELIABILITY		RETINAL IMAGES	
Investigation of behaviorally modified rats for use in explosives detection systems [AD-A114632]	N82-30895	Hyperacuity and interpolation by the visual pathways	A82-43100
RELIABILITY ANALYSIS		Factors determining the characteristics of the perception of stabilized retinal images	A82-43232
Overview of a procedure for human-reliability analysis [DE81-030816]	N82-30947	RHEOENCEPHALOGRAPHY	
REMOTE CONTROL		System for automatic analysis of rheoencephalograms	N82-31916
Proceedings of the Sixteenth Annual Conference on Manual Control [NASA-CR-169243]	N82-30833	RHYTHM (BIOLOGY)	
Evaluation of Smart sensor displays for multidimensional precision control of space shuttle remote manipulator	N82-30870	The contraction, regulation, and functional role of lymph vessels	A82-42603
Implantable, remotely-programmable insulin infusion system [DE82-003084]	N82-31927	A composite assessment of heart rhythm regulation during dosed functional loads	A82-43637
Supervisory control: Problems, theory and experiment for application to human-computer interaction in undersea remote systems [AD-A116236]	N82-31949	RIBONUCLEAR ACIDS	
REMOTE HANDLING		Indices of the rat central nervous system metabolism during 36- and 60-day hypokinesia [NASA-TM-76870]	N82-30883
A comparison of control modes for time-delayed remote manipulation	N82-30868	RNA accumulation in the body of neurons as an indicator of their functional deafferentation [NASA-TM-76850]	N82-30922
REMOTE MANIPULATOR SYSTEM		Reaction to hypokinesia and hyperkinesia of somatotrophic neurons in the motor zone of the cerebral cortex in rabbits [NASA-TM-76885]	N82-30925
Evaluation of Smart sensor displays for multidimensional precision control of space shuttle remote manipulator	N82-30870	Changes in rat tissue deoxyribonucleoprotein and nucleic acids following flight aboard Cosmos-1129 biosatellite	N82-31907
RENAL FUNCTION		RIDING QUALITY	
Renin-angiotensin-aldosterone system and electrolyte metabolism in rat blood after flight aboard Cosmos-1129 biosatellite	N82-31918	Vibration and comfort. I - Translational seat vibration	A82-42829
RESEARCH AND DEVELOPMENT		Vibration and comfort. II - Rotational seat vibration	A82-42830
Medical support and technology for long-duration space missions [IAF PAPER 82-174]	A82-44687	RISK	
RESPIRATION		Overview of a procedure for human-reliability analysis [DE81-030816]	N82-30947
Investigation on the carcinogenic effect of trichlorethylene by inhalation and mechanisms of metabolic bioactivation [BMFT-PB-HA-82-067]	N82-30933	Probabilistic methodology for estimating radiation induced cancer risk [DE82-001474]	N82-31929
RESPIRATORY DISEASES		ROBOTS	
Fluid distribution in progressive pulmonary edema: A low-temperature scanning electron microscopy study [DE82-002254]	N82-31928	Experimental evaluation of the concept of supervisory manipulation	N82-30869
RESPIRATORY PHYSIOLOGY		Human factors and robotics: Current status and future prospects [AD-A115042]	N82-30945
Activation of lipid peroxidation during stress in man, evaluated according to the content of pentane in expired air	A82-42600	Optical fiber multiple sensor for gripping complex objects	N82-32298
Physiological mechanisms determining the mechanical work of breathing for different types of muscular activity	A82-43237	ROTATING ENVIRONMENTS	
Hyperoxia inhibits stimulated superoxide release by rat alveolar macrophages	A82-44143	Measurement of vestibular asymmetry in rotation tests	N82-31913
RESPIRATORY REFLEXES		S	
Factors inducing periodic breathing in humans - A general model	A82-44140	SAFETY MANAGEMENT	
RESPIRATORY SYSTEM		Overview of a procedure for human-reliability analysis [DE81-030816]	N82-30947
Computer simulation of respiratory control system	A82-43145	SALYUT SPACE STATION	
REST		Psychophysiological performance examination onboard the orbital complex Salyut-Soyuz [IAF PAPER 82-171]	A82-44686
Hemodynamic response to converting enzyme inhibition at rest and exercise in humans	A82-44135	The first joint Franco-Soviet manned flight - The posture experiment [IAF PAPER 82-183]	A82-44689
SAMPLES		Electron paramagnetic resonance assignment: An analysis of methods used for biological samples [ISS-T-82/2]	N82-31889

SEATS
 Vibration and comfort. I - Translational seat vibration A82-42829
 Vibration and comfort. II - Rotational seat vibration A82-42830

SECRECTIONS
 State of the endocrine glands in hypodynamia (A review of the literature) [NASA-TM-76906] N82-30926

SEISMOCARDIOGRAPHY
 Seismocardiographic evaluation of contractile function of the myocardium of hypokinetic rats N82-31902

SENSITIVITY
 Activation of the cerebral gba-ergic inhibiting system in stress [NASA-TM-76867] N82-30881

SENSITIZING
 Effect of sensitization on development of stress gastric ulcers in rats [NASA-TM-76868] N82-30892

SENSORMOTOR PERFORMANCE
 The dynamics of certain psychophysiological indicators under the cumulative effect of Coriolis accelerations A82-42995
 The role of the extrapolation and dynamic stereotype in the mechanism of the formation and improvement of adequate motor coordination A82-43651
 Proceedings of the Sixteenth Annual Conference on Manual Control [NASA-CH-169243] N82-30833

SENSORS
 Evaluation of Smart sensor displays for multidimensional precision control of space shuttle remote manipulator N82-30870

SENSORY DEPRIVATION
 RNA accumulation in the body of neurons as an indicator of their functional deafferentation [NASA-TM-76850] N82-30922

SERVOCONTROL
 Evaluation of Smart sensor displays for multidimensional precision control of space shuttle remote manipulator N82-30870

SERVOMECHANISMS
 Experimental evaluation of the concept of supervisory manipulation N82-30869

SHIPS
 Mental hygiene of sailors --- Russian book A82-43602

SIGNAL PROCESSING
 Medical thermography with a pyroelectric vidicon camera [RSRE-3365] N82-30921

SIGNS AND SYMPTOMS
 Early clinical manifestations of vibration-noise pathology in miners of Donets Basin A82-42616
 Classification of pathological states of the stato-kinetic /vestibular/ analyzer A82-42630
 Medical monitoring and therapy of space motion sickness [IAF PAPER 82-169] A82-44684

SITTING POSITION
 Vibration and comfort. III - Translational vibration of the feet and back. IV - Application of experimental results A82-43674

SKIN (ANATOMY)
 The effects of the direction of attention on the transmission of cutaneous information --- French thesis A82-42083
 Ear-nose-throat electrodiagnostic device for determining the rheobase of human mucosa and skin A82-42629

SKIN TEMPERATURE (BIOLOGY)
 An examination of heat exchanges in man - Establishment of a reference technique for measuring average cutaneous temperatures using infrared thermometry --- French thesis A82-42080

SLEEP
 Effect of heat stress on cutaneous vascular responses to the initiation of exercise A82-44146
 Sleep and motor activity: Stages of the ontogenetic evolution of the supraspinal motor control in the human sleep cycle --- Russian book A82-43607
 Factors inducing periodic breathing in humans - A general model A82-44140
 Cognitive performance, sleep quality and mood during deep oxy-helium diving [RNP-1/81] N82-30920
 A Trimix saturation dive to 660 meters: Studies of cognitive performance, mood and sleep quality [RPN-2/82] N82-31923

SPACE ENVIRONMENT SIMULATION
 Space telescope neutral buoyancy simulations: The first two years [NASA-TM-82485] N82-30942

SPACE EXPLORATION
 Planetary atmospheres and the search for life [IAF PAPER 82-268] A82-44708

SPACE FLIGHT STRESS
 Medical monitoring and therapy of space motion sickness [IAF PAPER 82-169] A82-44684
 Psychophysiological performance examination onboard the orbital complex Salyut-Soyuz [IAF PAPER 82-171] A82-44686
 Catecholamines and their enzymes in discrete brain areas of rats after space flight on biosatellites Cosmos [IAF PAPER 82-180] A82-44688
 Activity of rat adrenal medula after flight aboard Cosmos-1129 biosatellite N82-31905
 Stereological analysis of rat bone tissue after flight aboard Cosmos-1129 biosatellite N82-31906
 Changes in rat tissue deoxyribonucleoprotein and nucleic acids following flight aboard Cosmos-1129 biosatellite N82-31907
 Renin-angiotensin-aldosterone system and electrolyte metabolism in rat blood after flight aboard Cosmos-1129 biosatellite N82-31918
 Epinephrine and norepinephrine concentrations in rat cardiac ventricles and atria after flight aboard Cosmos-1129 biosatellite N82-31919
 Rat blood plasma corticosterone after flight aboard Cosmos-1129 biosatellite N82-31920
 Deoxyribonucleoprotein and nucleic acid content of rat tissues after flight aboard Cosmos-936 biosatellite N82-31921
 The advantage of the lower body negative pressure test in aerospace medicine N82-31942
 Techniques for cardiovascular examination in human centrifuges and the principal results obtained N82-31943
 Cybernetic analysis of cardiac rhythm of Salyut-6 orbital station crew during graded exercise test N82-32282
 Combined rehabilitation and therapeutic measures in space medicine N82-32283

SPACE PERCEPTION
 Contrast increment thresholds of rhesus monkeys A82-43099
 Threshold models of spatial vision A82-43230
 Absence of depth processing in the large-frame rod-and-frame effect --- human space perception A82-44823
 Inhibition of the rod-and-frame effect by circular contours --- human depth perception A82-44824

SPACE STATIONS
 Medical support and technology for long-duration space missions [IAF PAPER 82-174] A82-44687

SPACEBORNE EXPERIMENTS

The first joint Franco-Soviet manned flight - The posture experiment
[IAF PAPER 82-183] A82-44689
Changes in rat tissue deoxyribonucleoprotein and nucleic acids following flight aboard Cosmos-1129 biosatellite N82-31907

SPACEBORNE TELESCOPES

Space telescope neutral buoyancy simulations: The first two years
[NASA-TM-82485] N82-30942

SPACECRAFT CABIN SIMULATORS

Dehydration therapy for subjects exposed to simulated spaceflight conditions N82-31897

SPACECRAFT ENVIRONMENTS

Regenerable life support for the space station - A technology status summary
[IAF PAPER 82-45] A82-44658
Habitability support for manned missions of space 2000
[IAF PAPER 82-170] A82-44685
Dehydration therapy for subjects exposed to simulated spaceflight conditions N82-31897

SPACECREWS

Habitability support for manned missions of space 2000
[IAF PAPER 82-170] A82-44685

SPLEEN

Effect of single exposure to microwaves on quantity and functional properties of T and B lymphocytes of guinea pig and mouse spleen N82-30913

STATIC DISCHARGERS

Formation of systemic adaptation reactions in static magnetic fields N82-30904
Changes in transcapillary metabolism in patients with chronic venous insufficiency of legs under influence of static magnetic fields N82-30907

STATIC ELECTRICITY

Cytogenetic and gonadotoxic effects of static electric fields N82-30915

STATISTICAL ANALYSIS

A performance analysis study of a complex G field experiment N82-30852

STEERING

The bench mining system: Progress in two-dimensional simulation of steering characteristics
[RR-176] N82-31950

STELLAR ENVELOPES

Laboratory simulation of interstellar chemical evolution A82-41665

STEREOSCOPY

Stereological analysis of rat bone tissue after flight aboard Cosmos-1129 biosatellite N82-31906

STOMACH

Effect of sensitization on development of stress gastric ulcers in rats
[NASA-TM-76868] N82-30892
Efficacy of cimetidine in the prevention of ulcer formation in the stomach during immobilization stress
[NASA-TM-76864] N82-30923

STRESS (PHYSIOLOGY)

The condition of the cardiovascular system in air traffic controllers according to data acquired at the workplace A82-42614

A physiological justification of allowable noise levels in work involving heavy physical labor under nervous stress A82-42617

Changes in the lymphoid organs of rats under the effect of acute hypoxia A82-42623

Analysis of methods for evaluating thermal stress --- effects on human beings A82-42994

Individual features of the vegetative regulation of body functions during the adaptation of sailors in the tropics A82-42996

Evaluation of the heaviness of physical work with marked nervous-emotional stress A82-43240

Internal stresses and contractility of myocardium A82-43513

The effect of a physiological load on the exchange and phosphorylation of cell membrane proteins in the brain of rats A82-43654

Effect of heat stress on cutaneous vascular responses to the initiation of exercise A82-44146

Head cooling and heat A82-44292

Possible adaptation to strong magnetic fields --- by animals
[IAF PAPER 82-188] A82-44690

Influence of stress on the blood system reaction in adrenalectomized mice
[NASA-TM-76902] N82-30877

Effect of mebicar on animals under extreme conditions
[NASA-TM-76851] N82-30879

Reaction of the blood system to single and double effect of a stress agent
[NASA-TM-76866] N82-30880

Activation of the cerebral gba-ergic inhibiting system in stress
[NASA-TM-76867] N82-30881

Catecholamines in the blood plasma of August and Wistar rats during emotional stress
[NASA-TM-76872] N82-30885

Changes of blood plasma renin activity in August and Wistar rats under emotional stress
[NASA-TM-76873] N82-30886

Glucocorticoid receptors and metabolic disturbances in the (rat) liver and heart during immobilization
[NASA-TM-76874] N82-30887

Genetic and individual differences in cardiovascular disturbances of rats during experimental emotional stress
[NASA-TM-76911] N82-30890

Effect of immobilization stress on diacyl- and plasmalogen-derivatives of phospholipids in various rat organs and tissues
[NASA-TM-76852] N82-30891

Effect of sensitization on development of stress gastric ulcers in rats
[NASA-TM-76868] N82-30892

Specific cytoplasmic glucocorticoid receptors of rat liver under conditions of immobilization stress
[NASA-TM-76863] N82-30893

Specific cytoplasmic glucocorticoid receptors of the rat liver during immobilization stress
[NASA-TM-76869] N82-30894

Efficacy of cimetidine in the prevention of ulcer formation in the stomach during immobilization stress
[NASA-TM-76864] N82-30923

The role of the hypophysis in early reaction of hemopoietic organs to stress
[NASA-TM-76865] N82-30924

Detailed research plan: Cardiovascular effects of noise
[PB82-163379] N82-30934

STRESS (PSYCHOLOGY)

Activation of lipid peroxidation during stress in man, evaluated according to the content of pentane in expired air A82-42600

Emotional stress and hypokinesia in the origination of cardiac disorders and hypertensive states A82-42608

A systems analysis of individual vascular reactions in animals under experimentally induced emotional stress A82-42610

A physiological justification of allowable noise levels in work involving heavy physical labor under nervous stress A82-42617

Electrocardiographic correlates of emotional stress A82-43236
 Evaluation of the heaviness of physical work with marked nervous-emotional stress A82-43240
 The mechanisms of hypertensive responses during emotional stress A82-43630
 A composite assessment of heart rhythm regulation during dosed functional loads A82-43637
 Biogenic monoamine content of the ganglia in the autonomic nervous system of rabbits during acute experimental emotional stress [NASA-TM-76900] N82-30875
 Activation of the cerebral gba-ergic inhibiting system in stress [NASA-TM-76867] N82-30881
 Emotional stress as a factor in cardiovascular disturbances [NASA-TM-76910] N82-30889
 Genetic and individual differences in cardiovascular disturbances of rats during experimental emotional stress [NASA-TM-76911] N82-30890

SUBMARINES
 Position paper: The toxic effects of chronic exposure to low levels of carbon dioxide [AD-A115053] N82-30930

SUPERHIGH FREQUENCIES
 Meteorological radar as source of SHF electromagnetic field energy and problems of environmental hygiene N82-30911
 Effects of superhigh frequency electromagnetic fields on animals of different ages N82-30916

SURFACE TO AIR MISSILES
 Modeling human target acquisition in ground-to-air weapon systems N82-30836

SURGERY
 Anesthesia, surgery and resuscitation during manned spaceflights N82-31894

SURVEYS
 The airline pilot's view of flight deck workload: A preliminary study using a questionnaire [RAE-TM-FS (B)-465] N82-31945

SYMPATHETIC NERVOUS SYSTEM
 The effectiveness of neurohumoral influences on pulmonary circulation A82-42607
 The mechanisms of the development of the cardiogenic vagosympathetic reflexes A82-43631

SYNAPSES
 Stereological analysis of interneuronal contacts in the cerebral cortex of rats during the posthypoxic period A82-42622

SYNTHESIS (CHEMISTRY)
 DNA and RNA synthesis in isolated nuclei of rat skeletal muscles during hypodynamia [NASA-TM-76875] N82-30888

SYSTEM FAILURES
 Pilot reaction to attitude gyro failure: A flight experiment N82-30858

SYSTEMS ANALYSIS
 New aspects of functional system theory N82-30936
 Plastic properties of motivation as prime component in systemic organization of purposeful behavioral acts N82-30937

SYSTEMS INTEGRATION
 Logistics support productivity improvement A82-42196

SYSTEMS SIMULATION
 Computer simulation of respiratory control system A82-43145

SYSTOLIC PRESSURE
 Internal stresses and contractility of myocardium A82-43513

T

TACTILE DISCRIMINATION
 Optical fiber multiple sensor for gripping complex objects N82-32298

TARGET ACQUISITION
 A finite-state description of coordination in a two-handed target acquisition task A82-44514
 Modeling human target acquisition in ground-to-air weapon systems N82-30836
 Prediction of short term tracking tasks using an optimal pilot model [AD-A115543] N82-30940

TARGET RECOGNITION
 The effects of color and contrast on target recognition performance using monochromatic television displays [AD-A116238] N82-31946

TASK COMPLEXITY
 The effects of the direction of attention on the transmission of cutaneous information --- French thesis A82-42083

TASKS
 Combined discrete network continuous control modelling of operator behavior N82-30861

TECHNOLOGY ASSESSMENT
 Information automation and the Apollo program - A retrospective A82-44513
 Regenerable life support for the space station - A technology status summary [IAF PAPER 82-45] A82-44658
 An analytic framework for allocating R and D resources at GRI [PB82-168428] N82-30898

TELEOPERATORS
 Experimental evaluation of the concept of supervisory manipulation N82-30869
 Evaluation of Smart sensor displays for multidimensional precision control of space shuttle remote manipulator N82-30870

TELEVISION SYSTEMS
 The effects of color and contrast on target recognition performance using monochromatic television displays [AD-A116238] N82-31946

TEMPERATURE DISTRIBUTION
 Distribution of heat in biological tissues under influence of UHF electromagnetic fields --- for tumor treatment N82-30909

TEMPERATURE EFFECTS
 Temperature effects on lung mechanics in air- and liquid-filled rabbit lungs A82-44134
 Effect of heat stress on cutaneous vascular responses to the initiation of exercise A82-44146
 Head cooling and heat A82-44292

TEMPERATURE MEASURING INSTRUMENTS
 Thermography and microwave heating - The design and fabrication of systems intended for biological and medical use --- French thesis A82-42087

TERAIN FOLLOWING AIRCRAFT
 A comparison of display formats for the electronic master monitor and advisory display system [AD-A115127] N82-30946

TEST PILOTS
 The role of the test pilot in flight tests A82-43329

THERAPY
 Characteristics of pharmacotherapeutic complications in otolaryngology /Review of the literature/ A82-42628
 Combined rehabilitation and therapeutic measures in space medicine N82-32283

THERMAL COMPORT		
Methods of human adaptation to heat	A82-42993	
Analysis of methods for evaluating thermal stress --- effects on human beings	A82-42994	
THERMOREGULATION		
Methods of human adaptation to heat	A82-42993	
Thermogenesis and muscle activity during the adaptation to cold --- Russian book	A82-43610	
Hormone response of normal and intermittent cold-preadapted humans to continuous cold	A82-44137	
THRESHOLDS (PERCEPTION)		
Contrast increment thresholds of rhesus monkeys	A82-43099	
Threshold models of spatial vision	A82-43230	
THYMUS GLAND		
Morphological criteria for diagnosing pathologies of the thymus with myasthenia	A82-42633	
State of the endocrine glands in hypodynamia (A review of the literature) [NASA-TM-76906]	N82-30926	
THYROID GLAND		
Role of the thyroid gland during adaptation of skeletal muscles to increased motor activity [NASA-TM-76871]	N82-30884	
State of the endocrine glands in hypodynamia (A review of the literature) [NASA-TM-76906]	N82-30926	
A technique for long-term measurements of thyroid function in beagle dogs using iodine 125 [FOA-A-59003-H3]	N82-31890	
Morphological distinctions of Macaca rhesus monkey thyroid under normal and various types of hypokinetic conditions	N82-31908	
TIME DEPENDENCE		
Dynamics of the process of the determination of orientation by man	A82-43231	
TIME DISCRIMINATION		
Effect of counting and tracking on verbal and production methods of time estimation	N82-30845	
TIME LAG		
A comparison of control modes for time-delayed remote manipulation	N82-30868	
TIME MEASUREMENT		
Effect of counting and tracking on verbal and production methods of time estimation	N82-30845	
TISSUES (BIOLOGY)		
Principles of the definition and classification of tissues	A82-42620	
The topography of elements of the cardiac conduction system	A82-42625	
Stimulating effect of exposure of rat sternum to variable magnetic field on antibody production in the spleen	N82-30900	
Distribution of heat in biological tissues under influence of UHF electromagnetic fields --- for tumor treatment	N82-30909	
Stereological analysis of rat bone tissue after flight aboard Cosmos-1129 biosatellite	N82-31906	
Deoxyribonucleoprotein and nucleic acid content of rat tissues after flight aboard Cosmos-936 biosatellite	N82-31921	
TOMOGRAPHY		
Contribution of nuclear medicine in cardiology	N82-31939	
TOXIC HAZARDS		
Cytogenetic and gonadotoxic effects of static electric fields	N82-30915	
Biological availability of nickel arsenides: Toxic effects of particulate Ni ₅ As ₂ [DE82-000580]	N82-30932	
TOXICITY		
Position paper: The toxic effects of chronic exposure to low levels of carbon dioxide [AD-A115053]	N82-30930	
TOXICITY AND SAFETY HAZARD		
Investigation on the carcinogenic effect of trichlorethylene by inhalation and mechanisms of metabolic bioactivation [BMFT-FB-HA-82-007]	N82-30933	
TOXICOLOGY		
Morphology and coagulant function of human blood system during long exposure to low ammonia concentrations in a sealed environment	N82-31903	
TRACE CONTAMINANTS		
Morphology and coagulant function of human blood system during long exposure to low ammonia concentrations in a sealed environment	N82-31903	
TRACKING (POSITION)		
An analysis and modeling of the binocular system in human sagittal vision --- French thesis	A82-42090	
Modeling of human operator dynamics in simple manual control utilizing time series analysis	N82-30834	
A gunner model for an AAA tracking task with interrupted observations	N82-30835	
Pursuit tracking and higher levels of skill development in the human pilot	N82-30839	
Modeling lateral acceleration effects on pilot performance	N82-30854	
TRACKING FILTERS		
An analog tracking filter for a swept-sine human vibration test	A82-41808	
TRAINING DEVICES		
Improved procedures training through use of aids developed from learning guidelines [AD-A113109]	N82-30939	
TRAINING EVALUATION		
Training and personnel impact on increased productivity	A82-42230	
Improved procedures training through use of aids developed from learning guidelines [AD-A113109]	N82-30939	
TRANQUILIZERS		
Effect of mebicar on animals under extreme conditions [NASA-TM-76851]	N82-30879	
TRANSDUCERS		
Comparative evaluation of informativeness of three corrected orthogonal leads and twelve conventional EKG leads in conducting functional tests	N82-31914	
TRANSLATIONAL MOTION		
Vibration and comfort. III - Translational vibration of the feet and back. IV - Application of experimental results	A82-43674	
TRANSMISSION		
A comparison of control modes for time-delayed remote manipulation	N82-30868	
TRANSMISSION LINES		
Effects of low-frequency (50 Hz) electric fields on animals of different ages	N82-30910	
TRANSPORT AIRCRAFT		
A model based technique for predicting pilot opinion ratings for large commercial transports	N82-30846	
TRANSVERSE ACCELERATION		
Modeling lateral acceleration effects on pilot performance	N82-30854	
TRINITROTOLUENE		
Investigation of behaviorally modified rats for use in explosives detection systems [AD-A114632]	N82-30895	

TROPICAL REGIONS

TROPICAL REGIONS
Individual features of the vegetative regulation of body functions during the adaptation of sailors in the tropics
A82-42996

TUMORS
Distribution of heat in biological tissues under influence of UHF electromagnetic fields --- for tumor treatment
N82-30909

TURBOPROP AIRCRAFT
Effect of synthesized propeller vibration on passenger annoyance in a turboprop interior noise environment
[NASA-TM-84515] N82-31944

U

ULCERS
Effect of sensitization on development of stress gastric ulcers in rats
[NASA-TM-76868] N82-30892

Efficacy of cimetidin in the prevention of ulcer formation in the stomach during immobilization stress
[NASA-TM-76864] N82-30923

ULTRAHIGH FREQUENCIES
Distribution of heat in biological tissues under influence of UHF electromagnetic fields --- for tumor treatment
N82-30909

ULTRASONICS
Echocardiography in the examination of pilots
N82-31937

ULTRAVIOLET RADIATION
Changes of the functional condition of the neocortex during direct application of optical radiation
A82-43655

UNDERWATER ACOUSTICS
Supervisory control: Problems, theory and experiment for application to human-computer interaction in undersea remote systems
[AD-A116236] N82-31949

V

VASCULAR SYSTEM
A systems analysis of individual vascular reactions in animals under experimentally induced emotional stress
A82-42610

An experimental study of the human blood-cerebral barrier using scanning electron microscopy
A82-42638

Changes in transcapillary metabolism in patients with chronic venous insufficiency of legs under influence of static magnetic fields
N82-30907

VASOCONSTRICITION
The contraction, regulation, and functional role of lymph vessels
A82-42603

The coronary vessels and the contractile apparatus of the myocardium in immune heart damage /Histochemical and ultrastructural studies/
A82-42605

Hypoxic pulmonary vasoconstriction and the size of hypoxic compartment
A82-44138

Effect of heat stress on cutaneous vascular responses to the initiation of exercise
A82-44146

VASOCONSTRICCTOR DRUGS
The effectiveness of neurohumoral influences on pulmonary circulation
A82-42607

VASODILATION
The interrelationship of the function of the blood kallikrein-kinin system with the main parameters of central hemodynamics during hypertension
A82-42175

Effect of heat stress on cutaneous vascular responses to the initiation of exercise
A82-44146

VESTIBULAR NYSTAGMUS
A general purpose data acquisition and analysis system for nystagmus and related data
[NASA-CR-167704] N82-30919

SUBJECT INDEX

Measurement of vestibular asymmetry in rotation tests
N82-31913

VESTIBULES
Classification of pathological states of the stato-kinetic /vestibular/ analyzer
A82-42630

The morphology of the connections of the cortical vestibular zone --- Russian book
A82-43611

A comprehensive system model for motion/space sickness: Preliminary results
N82-30855

VIBRATION EFFECTS
The effect of general vibration combined with intermittent noise on the human auditory function
A82-42615

Early clinical manifestations of vibration-noise pathology in miners of Donets Basin
A82-42616

Studies directed toward improving hygienic standards pertaining to total-body vibration resulting from heavy moving equipment
A82-42619

Vibration and comfort. I - Translational seat vibration
A82-42829

Vibration and comfort. II - Rotational seat vibration
A82-42830

Subjective response to whole-body vibration - The effects of posture
A82-42831

Vibration and comfort. III - Translational vibration of the feet and back. IV - Application of experimental results
A82-43674

Variability in human response to whole-body vibration - The effects of instructions
A82-43675

A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limb, head and eyes
N82-30853

Dynamics of functional state of heavy transport helicopter pilots in the course of flight shift
N82-31900

Effect of synthesized propeller vibration on passenger annoyance in a turboprop interior noise environment
[NASA-TM-84515] N82-31944

VIBRATION PERCEPTION
Early clinical manifestations of vibration-noise pathology in miners of Donets Basin
A82-42616

Studies directed toward improving hygienic standards pertaining to total-body vibration resulting from heavy moving equipment
A82-42619

Subjective response to whole-body vibration - The effects of posture
A82-42831

VIBRATION TESTS
An analog tracking filter for a swept-sine human vibration test
A82-41808

VIDICONS
Medical thermography with a pyroelectric vidicon camera
[RSRE-3365] N82-30921

VIKING MARS PROGRAM
Interpretation of Viking biology experiments
A82-43221

VISION
Hyperacuity and interpolation by the visual pathways
A82-43100

A cortically implantable multielectrode array for investigating the mammalian visual system
[AD-A115484] N82-30931

VISUAL CONTROL
The effect of visual information on the manual approach and landing
N82-30837

VISUAL DISCRIMINATION
Contrast increment thresholds of rhesus monkeys
A82-43099

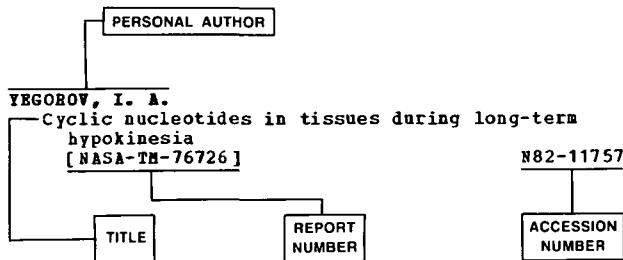
Absence of depth processing in the large-frame rod-and-frame effect --- human space perception	A82-44823	Changes in rat tissue deoxyribonucleoprotein and nucleic acids following flight aboard Cosmos-1129 biosatellite	N82-31907
VISUAL PERCEPTION		Rat blood plasma corticosterone after flight aboard Cosmos-1129 biosatellite	N82-31920
The organization of the afferent subcortical inputs of the visual region of the cat cerebrum	A82-42621	The advantage of the lower body negative pressure test in aerospace medicine	N82-31942
Three stimuli for visual motion perception compared	A82-42900		
Dynamics of the process of the determination of orientation by man	A82-43231	WHITE BLOOD CELLS	
Factors determining the characteristics of the perception of stabilized retinal images	A82-43232	Effects of +G sub x acceleration and adeutron on nucleic acid content and other parameters of mouse peripheral blood	N82-31909
Psychophysical characteristics of perception and bioelectric activity of the brain during micropolarization of the occipital part of the hemispheres	A82-43235	WIND VELOCITY	
An experimental study of human pilot's scanning behavior	N82-30841	Aircrew windblast protection concepts, development and evaluation [AD-A115424]	N82-31947
A comprehensive system model for motion/space sickness: Preliminary results	N82-30855	WORK CAPACITY	
Performance tests for repeated measures: Moran and computer batteries [AD-A115068]	N82-30941	Levels of physiological reserves of sailors working a 10-hour shift	A82-42618
New look at models of visual performance [DE82-001337]	N82-31924	WORK-BEST CYCLE	
VISUAL SIGNALS		Levels of physiological reserves of sailors working a 10-hour shift	A82-42618
An analysis and modeling of the binocular system in human sagittal vision --- French thesis	A82-42090	WORKLOADS (PSYCHOPHYSIOLOGY)	
VISUAL STIMULI		The condition of the cardiovascular system in air traffic controllers according to data acquired at the workplace	A82-42614
The influence of afferent visual impulses on the morphological and biochemical parameters of the development of the neurons of the visual, motor, and parietal cerebral cortices	A82-42636	A physiological justification of allowable noise levels in work involving heavy physical labor under nervous stress	A82-42617
Three stimuli for visual motion perception compared	A82-42900	A composite assessment of heart rhythm regulation during dosed functional loads	A82-43637
Dynamics of the process of the determination of orientation by man	A82-43231	Proceedings of the Sixteenth Annual Conference on Manual Control [NASA-CR-169243]	N82-30833
Factors determining the characteristics of the perception of stabilized retinal images	A82-43232	Subjective scaling of mental workload in a multi-task environment	N82-30844
Absence of depth processing in the large-frame rod-and-frame effect --- human space perception	A82-44823	An analytical prediction of pilot ratings utilizing human pilot model	N82-30847
Inhibition of the rod-and-frame effect by circular contours --- human depth perception	A82-44824	FMP study of pilot workload. Qualification of workload via instrument scan [NASA-CR-169254]	N82-30944
		The airline pilot's view of flight deck workload: A preliminary study using a questionnaire [RAE-TM-FS(B)-465]	N82-31945
W			
WATER BALANCE			
The effect of body position and the administration of a diuretic on the water-salt status and the activity of the kidneys	A82-43238		
WEAPON SYSTEMS			
A gunner model for an AAA tracking task with interrupted observations	N82-30835		
Modeling human target acquisition in ground-to-air weapon systems	N82-30836		
Application of optimal control principles to describe the supervisory control behavior of AAA crew members	N82-30864		
WEAPONS DELIVERY			
Aerial combat simulation in the U.S. Air Force	A82-42794		
WEIGHTLESSNESS			
Medical monitoring and therapy of space motion sickness [IAF PAPER 82-169]	A82-44684		
Catecholamines and their enzymes in discrete brain areas of rats after space flight on biosatellites Cosmos [IAF PAPER 82-180]	A82-44688		
Activity of rat adrenal medulla after flight aboard Cosmos-1129 biosatellite	N82-31905		

PERSONAL AUTHOR INDEX

AEROSPACE MEDICINE AND BIOLOGY/A *Continuing Bibliography (Suppl. 239)*

DECEMBER 1982

Typical Personal Author Index Listing



The title of the document is used to provide the user with a brief description of the subject matter. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

ABRAMOVA, E. M.
Studies directed toward improving hygienic standards pertaining to total-body vibration resulting from heavy moving equipment A82-42619

ABUSHKEVICH, V. G.
Functional means for the regulation of heart rhythm during burst stimulation of the vagus nerves A82-43632

ABYZOV, R. A.
Characteristics of pharmacotherapeutic complications in otolaryngology /Review of the literature/ A82-42628

ADAMS, R. P.
A critical value for O₂ transport in the rat A82-44141

ADAMS, W. J.
Aircrew windblast protection concepts, development and evaluation [AD-A115424] N82-31947

AGARWAL, G. C.
Modeling of human operator dynamics in simple manual control utilizing time series analysis N82-30834

AHARON, M.
Protein kinase activity in liver of heat-acclimated hamsters A82-44145

ALEC, K. P.
Role of the thyroid gland during adaptation of skeletal muscles to increased motor activity [NASA-TM-76871] N82-30884

ALEKSANIAN, Z. A.
The adaptive control of vegetative processes A82-43652

AMERY, A.
Hemodynamic response to converting enzyme inhibition at rest and exercise in humans A82-44135

AMIRKHANYAN, Y. A.
Morphological distinctions of Macaca rhesus monkey thyroid under normal and various types of hypokinetic conditions N82-31908

AMORETTI, R.
The contribution of cardiac mechanograms in the evaluation of pilots N82-31936

ANASTASOVA, M. P.
Effect of dosed physical loading on biological oxidation and bioenergy in liver and myocardium A82-43046

ANTONOV, V. V.
Comparative analysis of the biological effects of electromagnetic radiation. II - Eye damage. Cataractogenesis A82-43222

APSHKALNE, D. L.
Possible use of magnetobiological effects in neurosurgery N82-30905

ARETEVA, A. I.
Conjugated changes of the resistance and blood filling of cerebral vessels during shifts in the blood gas composition A82-43635

ASYAMOLOVA,
Percutaneous measurement of partial oxygen tension and local blood flow in man during orthostatic test N82-31904

AUBAKIROV, A. B.
The anatomy and topography of the human bronchopulmonary lymph nodes A82-42624

AVETIKIAN, SH. T.
The condition of the cardiovascular system in air traffic controllers according to data acquired at the workplace A82-42614

B

BABIIAK, V. I.
The dynamics of certain psychophysiological indicators under the cumulative effect of Coriolis accelerations A82-42995

BADAYEVA, L. N.
Cytogenetic and gonadotoxic effects of static electric fields N82-30915

BADDELEY, A. D.
Cognitive performance, sleep quality and mood during deep oxy-helium diving [RNP-1/81] N82-30920

A Trimix saturation dive to 660 meters: Studies of cognitive performance, mood and sleep quality [RPN-2/82] N82-31923

BAIR, R. E.
Implantable, remotely-programmable insulin infusion system [DE82-003084] N82-31927

BAKAY, E. A.
Stimulating effect of exposure of rat sternum to variable magnetic field on antibody production in the spleen N82-30900

BARHAM, S. S.
Biological availability of nickel arsenides: Toxic effects of particulate Ni₅As₂ [DE82-000580] N82-30932

BARON, S.
Procru: A model for analyzing flight crew procedures in approach to landing N82-30863

BARTONICKOVA, A.
Effects of microwave radiation on mouse hemopoietic stem cells and on animal resistance to ionizing radiation N82-30912

BAYEVSKIY, R. M.
Cybernetic analysis of cardiac rhythm of Salyut-6 orbital station crew during graded exercise test N82-32282

BAZAROV, V. G.
Classification of pathological states of the stato-kinetic /vestibular/ analyzer A82-42630

BAZHENOV, IU. I.
Thermogenesis and muscle activity during the adaptation to cold A82-43610

BAZITOV, A. A.
Principles of the definition and classification of tissues A82-42620

BEJCZY, A. K.
Evaluation of Smart sensor displays for multidimensional precision control of space shuttle remote manipulator N82-30870

BELKANIA, G. S.
Changes in the transaminase activity and several biochemical blood values in the acute period of experimental myocardial infarction in monkeys A82-42172

BELKANIYA, G. S.
Morphological distinctions of Macaca rhesus monkey thyroid under normal and various types of hypokinetic conditions N82-31908

BELL, B. J.
Diagnostic use of enzymatic test in experiments on monkeys N82-31915

BELONOGOV, A. A.
Overview of a procedure for human-reliability analysis [DE81-030816] N82-30947

BELOUS, A. K.
Effect of optokinetic stimulation on operator's functional state and professional work capacity N82-31896

BELOUS, A. K.
Internal stresses and contractility of myocardium A82-43513

BELOUSOVA, O. I.
Reaction of the blood system to single and double effect of a stress agent [NASA-TM-76866] N82-30880

BELOVA, E. V.
Electrocardiographic correlates of emotional stress A82-43236

BELOVA, T. I.
Catecholamines in the blood plasma of August and Wistar rats during emotional stress [NASA-TM-76872] N82-30885

BELOV, T. I.
Changes of blood plasma renin activity in August and Wistar rats under emotional stress [NASA-TM-76873] N82-30886

BELYI, B. I.
Features of information processing in the right and left hemispheres of the human brain /A survey of the literature/ A82-42632

BENUMOF, J. L.
Hypoxic pulmonary vasoconstriction and the size of hypoxic compartment A82-44138

BERDYSHEV, V. V.
Individual features of the vegetative regulation of body functions during the adaptation of sailors in the tropics A82-42996

BEREGOVKIN, A. V.
Combined rehabilitation and therapeutic measures in space medicine N82-32283

BERMAN, S.
New look at models of visual performance [DE82-001337] N82-31924

BERSHADSKII, B. G.
The mechanisms of hypertensive responses during emotional stress A82-43630

BESPALOVA, L. A.
Specificity of ultrastructural changes in rat cardiomyocytes after local gamma-irradiation and hypokinesia [NASA-TM-76853] N82-30882

BIRD, K. L.
Effect of counting and tracking on verbal and production methods of time estimation N82-30845

BITTNER, A. C., JR.
Performance tests for repeated measures: Moran and computer batteries [AD-A115068] N82-30941

BOABER, P. A.
Subjective response to whole-body vibration - The effects of posture A82-42831

BOBOKOV, A. I.
Variability in human response to whole-body vibration - The effects of instructions A82-43675

BOBOKOV, A. I.
Glucocorticoid receptors and metabolic disturbances in the (rat) liver and heart during immobilization [NASA-TM-76874] N82-30887

BOBOKOV, A. I.
Specific cytoplasmic glucocorticoid receptors of rat liver under conditions of immobilization stress [NASA-TM-76863] N82-30893

BOBOKOV, A. I.
Specific cytoplasmic glucocorticoid receptors of the rat liver during immobilization stress [NASA-TM-76869] N82-30894

BOBKOVKA, A. S.
Specific cytoplasmic glucocorticoid receptors of rat liver under conditions of immobilization stress [NASA-TM-76863] N82-30893

BOBKOVKA, A. S.
Specific cytoplasmic glucocorticoid receptors of the rat liver during immobilization stress [NASA-TM-76869] N82-30894

BOEMING, R. A.
Logistics support productivity improvement A82-42196

BOGNAE, L.
Psychophysiological performance examination onboard the orbital complex Salyut-Soyuz [IAF PAPER 82-171] A82-44686

BOGOLEPOVA, I. M.
Morphological features of the individual structure of the human brain A82-42637

BOGOLEVUBOV, V. M.
Status and prospects of research on biological and therapeutic effects of magnetic fields N82-30901

BOGOLEVUBOV, V. M.
Combined rehabilitation and therapeutic measures in space medicine N82-32283

BOGOMOLOV, V. V.
Combined rehabilitation and therapeutic measures in space medicine N82-32283

BOLTZ, R. L.
Contrast increment thresholds of rhesus monkeys A82-43099

BONDARENKO, V. M.
Study of the morphological and biological properties of obligate and facultative psychrophilic bacteria found in the Antarctic A82-43671

BORISOVA, E. P.
The contraction, regulation, and functional role of lymph vessels A82-42603

BOULANGE, M.
An investigation of the mechanical meaning of the surface electromyogram A82-42078

BOUTELIER, C.
Hormone response of normal and intermittent cold-preadapted humans to continuous cold A82-44137

BOYLE, P. J.
Coatings for the prevention of macrofouling in the OTEC program [DE82-003238] N82-30897

BRABY, R.
Improved procedures training through use of aids developed from learning guidelines [AD-A113109] N82-30939

BRADBURY, J. N.
Medical uses of accelerators [DE82-000572] N82-31926

BROOKS, T. L.
Experimental evaluation of the concept of supervisory manipulation N82-30869

BROWN, J. W.
Evaluation of Smart sensor displays for multidimensional precision control of space shuttle remote manipulator N82-30870

BUCHANAN, P.
Medical support and technology for long-duration space missions [IAF PAPER 82-174] A82-44687

BURGESS, D. E.
Medical thermography with a pyroelectric vidicon camera [RSRE-3365] N82-30921

BURIAKOV, I. B.
The mechanisms of the development of the cardiogenic vagosympathetic reflexes A82-43631

BURYKINA, L. M.
Experimental study of the combined effect of noise and acetone A82-42612

BUTENKO, G. N.
Heart antigens A82-43666

BYTKA, P. P.
Microcirculatory state in the case of chronic obliteration of arteries A82-42626

C

CAIN, S. M.
A critical value for O₂ transport in the rat A82-44141

CAPRARO, R.
The first joint Franco-Soviet manned flight - The posture experiment [IAF PAPER 82-183] A82-44689

CARLSON, G. A.
Implantable, remotely-programmable insulin infusion system [DE82-003084] N82-31927

CARRE, R.
Noninvasive techniques for cardiovascular examination of interest in aerospace medicine [AGARD-AG-277(FB)] N82-31930

Principal electrocardiographic anomalies in the evaluation of pilots N82-31931

The contribution of cardiac mechanograms in the evaluation of pilots N82-31936

CARTER, B. C.
Performance tests for repeated measures: Moran and computer batteries [AD-A115068] N82-30941

CHASIOTIS, D.
Regulation of glycogenolysis in human muscle at rest and during exercise A82-44144

CHAYALO, P. P.
Effect of restricted mobility on the composition and metabolism of blood lipoproteins in rabbits [NASA-TM-76846] N82-30871

CHAYOTH, R.
Protein kinase activity in liver of heat-acclimated hamsters A82-44145

CHEKMAN, I. S.
Characteristics of pharmacotherapeutic complications in otolaryngology /Review of the literature/ A82-42628

CHEN, J.
Life-cycle costing of life support equipment [AD-A116404] N82-31948

CHERKASOV, G. V.
Possible adaptation to strong magnetic fields [IAF PAPER 82-188] A82-44690

CHERNUKH, A. M.
Biomicroscopy of a microcirculatory bed in experiments - Possibilities, limitations, and prospects A82-42611

CHEBENYY, A. V.
DNA and RNA synthesis in isolated nuclei of rat skeletal muscles during hypodynamia [NASA-TM-76875] N82-30888

CHEBTOK, V. M.
A morphological investigation of the regulatory mechanisms of the intracerebral blood circulation A82-42627

CHESNOKOV, IU. V.
Stereological analysis of interneuronal contacts in the cerebral cortex of rats during the posthypoxic period A82-42622

CHIKALE, B. T.
Microcirculatory state in the case of chronic obliteration of arteries A82-42626

CHUGUNOVA, A. N.
Functional means for the regulation of heart rhythm during burst stimulation of the vagus nerves A82-43632

CHURBAR, A. V.
The topography of elements of the cardiac conduction system A82-42625

CLEAR, B.
New look at models of visual performance [DE82-001337] N82-31924

CLEMENT, G.
The first joint Franco-Soviet manned flight - The posture experiment [IAF PAPER 82-183] A82-44689

CLEVENSON, S. A.
Effect of synthesized propeller vibration on passenger annoyance in a turboprop interior noise environment [NASA-TM-84515] N82-31944

COIGNARD, A.
Echocardiography in the examination of pilots N82-31937

COKELET, G. R.
Some potential blood flow experiments for space [UR-3490-1720] N82-32068

COOK, P. A.
Aerial combat simulation in the U.S. Air Force A82-42794

CROSIER, W. G.
A general purpose data acquisition and analysis system for nystagmus and related data [NASA-CR-167704] N82-30919

CULMAN, J.
Catecholamines and their enzymes in discrete brain areas of rats after space flight on biosatellites Cosmos [IAF PAPER 82-180] A82-44688

CUMMINGS, R. J.
Aircrew windblast protection concepts, development and evaluation [AD-A115424] N82-31947

D

DAKOVSKA, L. N.
Effect of dosed physical loading on plasma and liver lipids and lipoproteins in rats A82-43045

Effect of dosed physical loading on biological oxidation and bioenergy in liver and myocardium A82-43046

DALLEMAGNE, G.
Biocorrosion [SNIAS-821-551-105] N82-31891

DANIELE, B. P.
Hyperoxia inhibits stimulated superoxide release by rat alveolar macrophages A82-44143

DARYANIAN, B.
Subjective scaling of mental workload in a multi-task environment N82-30844

DASAEVA, A. D.
Experimental study of the combined effect of noise and acetone A82-42612

DATSOV, Y. R.	Effects of +G sub x acceleration and adeutron on nuclei acid content and other parameters of mouse peripheral blood	N82-31909
DAVEMPORT, E. L.	A computer simulation approach to measurement of human control strategy	N82-30843
DAVYDOV, B. I.	Comparative analysis of the biological effects of electromagnetic radiation. II - Eye damage. Cataractogenesis	A82-43222
DEFAUX, M.	Optical fiber multiple sensor for gripping complex objects	N82-32298
DEGTYAREV, V. A.	Preflight examination results used to forecast cosmonaut endurance of orthostatic tests after spaceflight	N82-31917
DEMBITSKII, V. M.	Effect of immobilization stress on diacyl- and plasmalogen-derivatives of phospholipids in various rat organs and tissues [NASA-TM-76852]	N82-30891
DEMIDOV, T. M.	Dehydration therapy for subjects exposed to simulated spaceflight conditions	N82-31897
DEMINA, D. M.	Evaluation of the heaviness of physical work with marked nervous-emotional stress	A82-43240
DEMOKDOVA, N. K.	Experimental study of the combined effect of noise and acetone	A82-42612
DERYAGINA, G. P.	Effect of immobilization on the development of experimental arteriosclerosis in rabbits [NASA-TM-76901]	N82-30876
DESCANO, A.	Ballistocardiography: A noninvasive method moving towards clinical applications	N82-31940
DESHEVOI, Y. B.	The role of the hypophysis in early reaction of hemopoietic organs to stress [NASA-TM-76865]	N82-30924
DESOVA, A. A.	Use of physiological information in man-machine systems	A82-43388
DIDIER, A.	Principal electrocardiographic anomalies in the evaluation of pilots	N82-31931
	The contribution of cardiac mechanograms in the evaluation of pilots	N82-31936
	Examining arterial function by Doppler velocimetry: The advantage in aerospace medicine	N82-31938
DIELEMAN, L. A.	A critical value for O2 transport in the rat	A82-44141
DIRIN, V. A.	Changes in peripheral circulation of limbs during bone regeneration under influence of low-frequency magnetic fields	N82-30906
DIYEVSEPOVA, A. A.	Stimulating effect of exposure of rat sternum to variable magnetic field on antibody production in the spleen	N82-30900
DMITRIYeva, N. P.	Morphological distinctions of Macaca rhesus monkey thyroid under normal and various types of hypokinetic conditions	N82-31908
DOROFEEV, G. I.	Efficacy of cimetidine in the prevention of ulcer formation in the stomach during immobilization stress [NASA-TM-76864]	N82-30923
DOROSHEV, V. G.	Preflight examination results used to forecast cosmonaut endurance of orthostatic tests after spaceflight	N82-31917
DOVZHENKO, Y. M.	Preflight examination results used to forecast cosmonaut endurance of orthostatic tests after spaceflight	N82-31917
DRONIOU, J.	Ventricular preexcitation syndromes	N82-31932
	Echocardiography in the examination of pilots	N82-31937
DUBINIAKSKI, M. P.	Ear-nose-throat electrodiagnostic device for determining the rheobase of human mucosa and skin	A82-42629
DUFFEE, C. H.	Training and personnel impact on increased productivity	A82-42230
DUMANSKIY, Y. D.	Meteorological radar as source of SHF electromagnetic field energy and problems of environmental hygiene	N82-30911
DUNNING, D. E., JR.	Probabilistic methodology for estimating radiation induced cancer risk [DE82-001474]	N82-31929
DUSHKIN, V. A.	Catecholamines in the blood plasma of August and Wistar rats during emotional stress [NASA-TM-76872]	N82-30885
	Changes of blood plasma renin activity in August and Wistar rats under emotional stress [NASA-TM-76873]	N82-30886
	Genetic and individual differences in cardiovascular disturbances of rats during experimental emotional stress [NASA-TM-76911]	N82-30890
DUSHUKHAMEDOV, N. S.	Study of the morphological and biological properties of obligate and facultative psychrophilic bacteria found in the Antarctic	A82-43671
DVOBETSKIY, D. P.	The effectiveness of neurohumoral influences on pulmonary circulation	A82-42607
DYAKONOV, A. S.	Significance of magnetic field parameters to change in evoked bioelectric activity of the brain	N82-31910
DZHERELEI, V. I.	Early clinical manifestations of vibration-noise pathology in miners of Donets Basin	A82-42616
E		
EBENHOLTZ, S. M.	Absence of depth processing in the large-frame rod-and-frame effect	A82-44823
	Inhibition of the rod-and-frame effect by circular contours	A82-44824
EDME, J. L.	An analysis and modeling of the binocular system in human sagittal vision	A82-42090
EDWARDS, J. B.	The bench mining system: Progress in two-dimensional simulation of steering characteristics [RR-176]	N82-31950
ELLIS, G. A.	The airline pilot's view of flight deck workload: A preliminary study using a questionnaire [RAE-TM-FS (B)-465]	N82-31945
ENGLER, H. P.	A computer simulation approach to measurement of human control strategy	N82-30843

EPRATH, A.
FMP study of pilot workload. Qualification of workload via instrument scan
[NASA-CR-169254] N82-30944

EVLAMPIEVA, M. N.
Evaluation of the heaviness of physical work with marked nervous-emotional stress A82-43240

EVSTAFEV, V. N.
Levels of physiological reserves of sailors working a 10-hour shift A82-42618

F

FAGARD, R.
Hemodynamic response to converting enzyme inhibition at rest and exercise in humans A82-44135

FALLESSEN, J. J.
A comparison of display formats for the electronic master monitor and advisory display system [AD-A115127] N82-30946

FEDOROV, B. M.
Emotional stress and hypokinesia in the origination of cardiac disorders and hypertensive states A82-42608

Effect of hypokinesia on some red blood indices and the condition of regulatory systems [NASA-TM-76752] N82-30918

Combined rehabilitation and therapeutic measures in space medicine N82-32283

FEDOROV, I. V.
DNA and RNA synthesis in isolated nuclei of rat skeletal muscles during hypodynamia [NASA-TM-76875] N82-30888

FEDOROVICH, I. B.
Mechanisms of the damaging effect of light on retinal photoreceptors A82-43233

FEDOTOVA, M. I.
Influence of stress on the blood system reaction in adrenalectomized mice [NASA-TM-76902] N82-30877

Reaction of the blood system to single and double effect of a stress agent [NASA-TM-76866] N82-30880

FELL, R. D.
Effects of beta-adrenergic receptor blockade on glycogenolysis during exercise A82-44133

FERNANDEZ, E.
Algal culture studies related to a Closed Ecological Life Support System (CELSS) [NASA-CR-166375] N82-30943

FISHER, A. B.
Hyperoxia inhibits stimulated superoxide release by rat alveolar macrophages A82-44143

FLANAGAN, S. D.
Geometrical considerations in the separation of biological particles by affinity partitioning N82-32069

FLORES, H. E.
Polyamines and plant stress - Activation of putrescine biosynthesis by osmotic shock A82-44450

FORMAN, H. J.
Hyperoxia inhibits stimulated superoxide release by rat alveolar macrophages A82-44143

FROLKIS, V. V.
Blood circulation and aging A82-42609

FURUKAWA, S.
Medical support and technology for long-duration space missions [IAF PAPER 82-174] A82-44687

G

GAEVYI, M. D.
The dynamics of the development of postischemial cerebrovascular phenomena during the perfusion of the cerebral vessels with a stable volume of blood A82-42173

GAILLARD, J. P.
Contribution of nuclear medicine in cardiology N82-31939

GALDINOV, G. V.
Changes of the functional condition of the neocortex during direct application of optical radiation A82-43655

GALSTON, A. H.
Polyamines and plant stress - Activation of putrescine biosynthesis by osmotic shock A82-44450

GAOMA, J. I., JR.
Implantable, remotely-programmable insulin infusion system [DE82-003084] N82-31927

GARBUZ, A. V.
Interpretation of Viking biology experiments A82-43221

GAVRILENKO, V. I.
Physiological mechanisms determining the mechanical work of breathing for different types of muscular activity A82-43237

GAVROVSKAYA, L. K.
Efficacy of cimetidine in the prevention of ulcer formation in the stomach during immobilization stress [NASA-TM-76864] N82-30923

GERASIMENKO, V. M.
Cytogenetic effects of high-energy charged particles N82-31911

GERMAN, G. W., III
A cortically implantable multielectrode array for investigating the mammalian visual system [AD-A115484] N82-30931

GERSHTEN, L. M.
The influence of afferent visual impulses on the morphological and biochemical parameters of the development of the neurons of the visual, motor, and parietal cerebral cortices A82-42636

GLASER, G. W.
Absence of depth processing in the large-frame rod-and-frame effect A82-44823

GLAZHNIKOV, L. A.
The dynamics of certain psychophysiological indicators under the cumulative effect of Coriolis accelerations A82-42995

GLEZER, V. D.
Threshold models of spatial vision A82-43230

GOLDSMITH, H. L.
Some potential blood flow experiments for space [UR-3490-1720] N82-32068

GOLIKOV, P. P.
Specific cytoplasmic glucocorticoid receptors of rat liver under conditions of immobilization stress [NASA-TM-76863] N82-30893

Specific cytoplasmic glucocorticoid receptors of the rat liver during immobilization stress [NASA-TM-76869] N82-30894

GOLUDCHIKOVA, Z. A.
Comparative evaluation of informativeness of three corrected orthogonal leads and twelve conventional EKG leads in conducting functional tests N82-31914

GOLUBKIN, V. L.
The responses of the coronary vessels in dogs to hypothalamic stimulation in acute and chronic experiments A82-43634

GONCHAROV, I. B.
Anesthesia, surgery and resuscitation during manned spaceflights N82-31894

GORIZONTOV, P. D.
Influence of stress on the blood system reaction in adrenalectomized mice [NASA-TM-76902] N82-30877

GOROZHANIN, V. S.
Individual features in the organization of the human endocrinical system A82-42631

GOTTLIEB, G. L.
Modeling of human operator dynamics in simple manual control utilizing time series analysis N82-30834

GOVORUN, R. D.
Cytogenetic effects of high-energy charged particles N82-31911

GRAZIANI, I.
Protein kinase activity in liver of heat-acclimated hamsters A82-44145

GREEN, J.
A computer simulation approach to measurement of human control strategy N82-30843

GREENSTEIN, J. S.
A model of human decision making in multiple process monitoring situations N82-30862

GRIFFIN, M. J.
Vibration and comfort. I - Translational seat vibration A82-42829
Vibration and comfort. II - Rotational seat vibration A82-42830
Vibration and comfort. III - Translational vibration of the feet and back. IV - Application of experimental results A82-43674

GRISHANOVA, G. I.
Early clinical manifestations of vibration-noise pathology in miners of Donets Basin A82-42616

GRITSENKO, V. V.
Physiological mechanisms determining the mechanical work of breathing for different types of muscular activity A82-43237

GROMOVA, S. A.
Changes of the functional condition of the neocortex during direct application of optical radiation A82-43655

GURBVICEH, M. I.
The intracentral connections of the brain structures participating in cardiovascular control A82-43627

GURFINKEL, V.
The first joint Franco-Soviet manned flight - The posture experiment [IAF PAPER 82-183] A82-44689

GURLEY, L. R.
Biological availability of nickel arsenides: Toxic effects of particulate Ni5As2 [DE82-000580] N82-30932

H

HABUSING, M.
Color coding of information on electronic display devices A82-41681

HALE, C.
Application of optimal control principles to describe the supervisory control behavior of AIAA crew members N82-30864

HALLECK, M. S.
Biological availability of nickel arsenides: Toxic effects of particulate Ni5As2 [DE82-000580] N82-30932

HAMMER, J. M.
Design and evaluation of an onboard computer-based information system for aircraft A82-44512

HARRI, M.
Modification of training-induced responses by repeated norepinephrine injections in rats A82-44142

HARRIS, R. L., SR.
FMP study of pilot workload. Qualification of workload via instrument scan [NASA-CR-169254] N82-30944

HART, S.
Effect of counting and tracking on verbal and production methods of time estimation N82-30845

HAWETH, R. S.
Contrast increment thresholds of rhesus monkeys A82-43099

HEARON, B. P.
Dynamic preload as an impact protection concept A82-44290

HENDLER, E.
Pulmonary function measures before and after exposure of human subjects to +G(z) and +G(x) acceleration loads [AD-A114652] N82-30928

HENSCHLER, D.
Investigation on the carcinogenic effect of trichlorethylene by inhalation and mechanisms of metabolic bioactivation [BNFT-FB-HA-82-007] N82-30933

HERRALA, T. W.
Regenerative life support for the space station - A technology status summary [IAF PAPER 82-45] A82-44658

HESS, R. A.
Pursuit tracking and higher levels of skill development in the human pilot N82-30839

HICKMAN, B. E.
Aircrew ionizing doses from radioactive dust cloud generated by nuclear burst [AD-A115541] N82-30929

HIDEG, J.
Psychophysiological performance examination onboard the orbital complex Salyut-Soyuz [IAF PAPER 82-171] A82-44686

HILDEBRANDT, J.
Temperature effects on lung mechanics in air- and liquid-filled rabbit lungs A82-44134

HILLENBRAND, C.
Examining arterial function by Doppler velocimetry: The advantage in aerospace medicine N82-31938

HOGAN, H.
The role of antagonist coactivation in the control of natural movement N82-30867

HOLLOSZY, J. O.
Effects of beta-adrenergic receptor blockade on glycogenolysis during exercise A82-44133

HONORE, J.
The effects of the direction of attention on the transmission of cutaneous information A82-42083

HOOK, G. R.
Fluid distribution in progressive pulmonary edema: A low-temperature scanning electron microscopy study [DE82-002554] N82-31928

HULTHAN, E.
Regulation of glycogenolysis in human muscle at rest and during exercise A82-44144

HUNDAL, M. S.
An analog tracking filter for a swept-sine human vibration test A82-41808

I

IAKHO, M. M.
Functional conditions of the brain and cerebral pathology A82-42634

IANCHII, R. I.
The mechanism of the activating effect of anti-cardiac antibodies on the electrical and contractile activity of myocardial cells A82-43665

IANZINI, F.
Electron paramagnetic resonance assignment: An analysis of methods used for biological samples [ISS-T-82/2] N82-31889

IAVORSKA, M. M.
Effect of dosed physical loading on biological oxidation and bioenergy in liver and myocardium A82-43046

INIDRA, A.
Catecholamines in the blood plasma of August and Wistar rats during emotional stress [NASA-TM-76872] N82-30885

Changes of blood plasma renin activity in August and Wistar rats under emotional stress [NASA-TM-76873] N82-30886

ILCHEVICH, M. V. The mechanism of the activating effect of anti-cardiac antibodies on the electrical and contractile activity of myocardial cells A82-43665

ILLE, H. Principal electrocardiographic anomalies in the evaluation of pilots N82-31931

The contribution of cardiac mechanograms in the evaluation of pilots N82-31936

Examining arterial function by Doppler velocimetry: The advantage in aerospace medicine N82-31938

IMHOUE, C. Temperature effects on lung mechanics in air- and liquid-filled rabbit lungs A82-44134

IMHOUE, H. Temperature effects on lung mechanics in air- and liquid-filled rabbit lungs A82-44134

IONTOV, A. S. The morphology of the connections of the cortical vestibular zone A82-43611

IOSELIANI, K. K. Main directions and principles of psychological expertise of cosmonauts N82-31893

Controlography used for integral assessment of mental work capacity N82-31901

ISHIKAWA, Y. Laboratory simulation of interstellar chemical evolution A82-41665

IVANOV, K. P. Liver microcirculation in normoxia and hypoxia A82-43638

IVANOVA, S. M. Activation of lipid peroxidation during stress in man, evaluated according to the content of pentane in expired air A82-42600

IVASHKIN, V. T. Efficacy of cimetidin in the prevention of ulcer formation in the stomach during immobilization stress [NASA-TM-76864] N82-30923

J

JAGACINSKI, R. J. A finite-state description of coordination in a two-handed target acquisition task A82-44514

JEX, H. B. A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limb, head and eyes N82-30853

JINDRA, A. Renin-angiotensin-aldosterone system and electrolyte metabolism in rat blood after flight aboard Cosmos-1129 biosatellite N82-31918

JOHNSON, J. M. Effect of heat stress on cutaneous vascular responses to the initiation of exercise A82-44146

JOHNSON, W. W. A finite-state description of coordination in a two-handed target acquisition task A82-44514

JUHLIN-DANNFELT, A. C. Effects of beta-adrenergic receptor blockade on glycogenolysis during exercise A82-44133

K

KAGAN, B. B. Activation of lipid peroxidation during stress in man, evaluated according to the content of pentane in expired air A82-42600

KALANDAROVA, M. P. Morphology and coagulant function of human blood system during long exposure to low ammonia concentrations in a sealed environment N82-31903

KALINICHENKO, V. V. Combined rehabilitation and therapeutic measures in space medicine N82-32283

KALININA, M. K. Liver microcirculation in normoxia and hypoxia A82-43638

KAMBURG, R. A. Effect of mebicar on animals under extreme conditions [NASA-TM-76851] N82-30879

KAMENKOVICH, V. M. Dynamics of the process of the determination of orientation by man A82-43231

KAMENSKIY, V. M. Dynamics of functional state of heavy transport helicopter pilots in the course of flight shift N82-31900

KAN, B. L. The condition of the cardiovascular system in air traffic controllers according to data acquired at the workplace A82-42614

KARTSEVA, A. G. The intracranial connections of the brain structures participating in cardiovascular control A82-43627

KASHTANOV, S. I. Biogenic monoamine content of the ganglia in the autonomic nervous system of rabbits during acute experimental emotional stress [NASA-TM-76900] N82-30875

KAZYARIN, I. P. Effects of low-frequency (50 Hz) electric fields on animals of different ages N82-30910

KEARSLEY, G. P. Human factors and robotics: Current status and future prospects [AD-A115042] N82-30945

KHISAMBEEV, S. B. Main directions and principles of psychological expertise of cosmonauts N82-31893

Controlography used for integral assessment of mental work capacity N82-31901

KHOLMOGOROVA, M. V. The relationship between postural components and voluntary movement A82-43239

KHOLODOV, I. A. Distinctions of nervous system reactions to artificially intensified magnetic fields N82-30902

KHOLYAVKO, F. R. Meteorological radar as source of SHF electromagnetic field energy and problems of environmental hygiene N82-30911

KHOO, M. C. K. Factors inducing periodic breathing in humans - A general model A82-44140

KIKTENKO, A. I. An experimental study of the human blood-cerebral barrier using scanning electron microscopy A82-42638

KIKUT, R. P. Possible use of magnetobiological effects in neurosurgery N82-30905

KIKUTE, S. R.	Possible use of magnetobiological effects in neurosurgery	N82-30905
KIRLYENKO, T. A.	Effect of restricted mobility on the composition and metabolism of blood lipoproteids in rabbits [NASA-TM-76846]	N82-30871
KIRPICHNIKOV, A. B.	Evaluation of the heaviness of physical work with marked nervous-emotional stress	A82-43240
KIRSHIN, S. V.	Effect of mebicar on animals under extreme conditions [NASA-TM-76851]	N82-30879
KISLIAKOV, V. A.	The morphology of the connections of the cortical vestibular zone	A82-43611
KISLYAKOVA, V. P.	Glucocorticoid receptors and metabolic disturbances in the (rat) liver and heart during immobilization [NASA-TM-76874]	N82-30887
KLEINER, G. M.	Regenerable life support for the space station - A technology status summary [IAF PAPER 82-45]	A82-44658
KLEINER, D. L.	Modeling lateral acceleration effects on pilot performance	N82-30854
KLEMICOVA, V. A.	RNA accumulation in the body of neurons as an indicator of their functional deafferentation [NASA-TM-76850]	N82-30922
KLETTI, J.	An on-line procedure for the extraction of acoustically evoked potentials from the electroencephalogram	A82-41688
KLIMOVSKAYA, L. D.	Possible adaptation to strong magnetic fields [IAF PAPER 82-188]	A82-44690
KLIMOVSKAYA, L. D.	Significance of magnetic field parameters to change in evoked bioelectric activity of the brain	N82-31910
KOPANOW, R. W.	Measurement of vestibular asymmetry in rotation tests	N82-31913
KOJARINOV, V.	The first joint Franco-Soviet manned flight - The posture experiment [IAF PAPER 82-183]	A82-44689
KOLGANOV, A. V.	A physiological justification of allowable noise levels in work involving heavy physical labor under nervous stress	A82-42617
KOMOLOWA, G. S.	DNA and RNA synthesis in isolated nuclei of rat skeletal muscles during hypodynamia [NASA-TM-76875]	N82-30888
KORKACH, V.	State of the endocrine glands in hypodynamia (A review of the literature) [NASA-TM-76906]	N82-30926
KORN, J.	Modeling lateral acceleration effects on pilot performance	N82-30854
KORNILOVA, L. N.	Effect of optokinetic stimulation on operator's functional state and professional work capacity	N82-31896
KORSAKOV, I. A.	Psychophysical characteristics of perception and bioelectric activity of the brain during micropolarization of the occipital part of the hemispheres	A82-43235
KOSTELIANETS, N. B.	Dynamics of the process of the determination of orientation by man	A82-43231
KOTOV, A. V.	Plastic properties of motivation as prime component in systemic organization of purposeful behavioral acts	N82-30937
KOTSKOVICH, R. P.	The interaction of Purkinje cells, capillaries and glia in the cerebellar cortex of normal and hypokinetic cats [NASA-TM-76882]	N82-30873
KOVALENKO, V. P.	Analysis of methods for evaluating thermal stress	A82-42294
KOVALEV, O. A.	Regional redistributions of the blood in blood loss and mechanical trauma against the background of various functional states of the body [NASA-TM-76880]	N82-30872
KOVALIK, A. V.	Control of muscle activity in unloaded conditions [NASA-TM-76883]	N82-30927
KOVANOV, K. V.	The role of the integrity of the central synaptic and direct influences in the regulation of hemodynamics	A82-43628
KOZARENKO, O. P.	Psychophysiological performance examination onboard the orbital complex Salyut-Soyuz [IAF PAPER 82-171]	A82-44686
KOZYARIN, I. P.	Effects of superhigh frequency electromagnetic fields on animals of different ages	N82-30916
KRASILNIKOV, V. G.	Conjugated changes of the resistance and blood filling of cerebral vessels during shifts in the blood gas composition	A82-43635
KRAUSE, M.	Performance tests for repeated measures: Moran and computer batteries [AD-A115068]	N82-30941
KRAVCHENKO, S. I.	Effect of optokinetic stimulation on operator's functional state and professional work capacity	N82-31896
KRIVENIUK, V. V.	Internal stresses and contractility of myocardium	A82-43513
KRIVORUCHKO, B. I.	Regional redistributions of the blood in blood loss and mechanical trauma against the background of various functional states of the body [NASA-TM-76880]	N82-30872
KROHAUER, R. E.	Factors inducing periodic breathing in humans - A general model	A82-44140
KROPACEVA, E.	Deoxyribonucleoprotein and nucleic acid content of rat tissues after flight aboard Cosmos-936 biosatellite	N82-31921
KRUCHININ, V. M.	Functional means for the regulation of heart rhythm during burst stimulation of the vagus nerves	A82-43632
KRUMIHYA, G. A.	Possible use of magnetobiological effects in neurosurgery	N82-30905
KRUPINA, T. N.	Combined rehabilitation and therapeutic measures in space medicine	N82-32283
KUBLI, S. K.	Formation of systemic adaptation reactions in static magnetic fields	N82-30904
KUCHERENKO, A. G.	The influence of prostaglandins and polyunsaturated fatty acids on the corticosteroid metabolism of normal and spontaneously hypertensive rats	A82-42174

KUDRYASHOVA, Z. M.
Dehydration therapy for subjects exposed to simulated spaceflight conditions N82-31897

KUKUEV, L. A.
The influence of afferent visual impulses on the morphological and biochemical parameters of the development of the neurons of the visual, motor, and parietal cerebral cortices A82-42636

KUKULIS, I. P.
The interrelationship between the pressor response and energy metabolism during isometric muscle contractions A82-43636

KULAGIN, V. K.
Regional redistributions of the blood in blood loss and mechanical trauma against the background of various functional states of the body [NASA-TM-76880] N82-30872

KULESHOVA, T. P.
The morphology of the connections of the cortical vestibular zone A82-43611

KURIKI, K.
Laboratory simulation of interstellar chemical evolution A82-41665

KURKINA, L. M.
Indices of the rat central nervous system metabolism during 36- and 60-day hypokinesia [NASA-TM-76870] N82-30883

KURNARVA, V. P.
Experimental study of the combined effect of noise and acetone A82-42612

KUUSELA, P.
Modification of training-induced responses by repeated norepinephrine injections in rats A82-44142

KUZMINA, Z. P.
Possible adaptation to strong magnetic fields [IAF PAPER 82-188] A82-44690

KUZNETSOV, V. I.
Seismocardiographic evaluation of contractile function of the myocardium of hypokinetic rats N82-31902

KVETNANSKIY, B.
Catecholamines in the blood plasma of August and Wistar rats during emotional stress [NASA-TM-76872] N82-30885

Changes of blood plasma renin activity in August and Wistar rats under emotional stress [NASA-TM-76873] N82-30886

KVETNANSKY, B.
Catecholamines and their enzymes in discrete brain areas of rats after space flight on biosatellites Cosmos [IAF PAPER 82-180] A82-44688

Renin-angiotensin-aldosterone system and electrolyte metabolism in rat blood after flight aboard Cosmos-1129 biosatellite N82-31918

Epinephrine and norepinephrine concentrations in rat cardiac ventricles and atria after flight aboard Cosmos-1129 biosatellite N82-31919

Rat blood plasma corticosterone after flight aboard Cosmos-1129 biosatellite N82-31920

KVETNANSKY, B. A.
Activity of rat adrenal medula after flight aboard Cosmos-1129 biosatellite N82-31905

L

LAFON, J. L.
The first joint Franco-Soviet manned flight - The posture experiment [IAF PAPER 82-183] A82-44689

LAHIRI, S.
Aortic body chemoreceptor responses to dopamine, haloperidol, and pargyline A82-44136

LANCRAFT, R.
Procrus: A model for analyzing flight crew procedures in approach to landing N82-30863

LANTRADE, P.
Examining arterial function by Doppler velocimetry: The advantage in aerospace medicine N82-31938

LAPIN, A. R.
Effect of sensitization on development of stress gastric ulcers in rats [NASA-TM-76868] N82-30892

LAPSHINA, N. A.
Preflight examination results used to forecast cosmonaut endurance of orthostatic tests after spaceflight N82-31917

LABITONOV, L. A.
Preflight examination results used to forecast cosmonaut endurance of orthostatic tests after spaceflight N82-31917

LAVRISHCHEVA, G. I.
Changes in peripheral circulation of limbs during bone regeneration under influence of low-frequency magnetic fields N82-30906

LECROART, J.-L.
An examination of heat exchanges in man - Establishment of a reference technique for measuring average cutaneous temperatures using infrared thermometry A82-42080

LEGGETT, R. W.
Probabilistic methodology for estimating radiation induced cancer risk [DB82-001474] N82-31929

LEGUAY, G.
The exercise electrocardiogram N82-31933

Continuous ECG registration according to the Holter method N82-31934

LEMONDZHAVA, N. I.
Changes in the transaminase activity and several biochemical blood values in the acute period of experimental myocardial infarction in monkeys A82-42172

Diagnostic use of enzymatic test in experiments on monkeys N82-31915

LEPSKY, A.
The first joint Franco-Soviet manned flight - The posture experiment [IAF PAPER 82-183] A82-44689

LESTIENNE, P.
The first joint Franco-Soviet manned flight - The posture experiment [IAF PAPER 82-183] A82-44689

LEVI, D. M.
Contrast increment thresholds of rhesus monkeys A82-43099

LEVISON, W. H.
A model based technique for predicting pilot opinion ratings for large commercial transports N82-30846

LEVKOVICH, IU. I.
Liver microcirculation in normoxia and hypoxia A82-43638

LEWIS, J. L.
Evaluation of Smart sensor displays for multidimensional precision control of space shuttle remote manipulator N82-30870

LEWIS, R. O.
Biofouling countermeasure evaluations for OTEC heat exchangers [DB82-003918] N82-30896

LEWIS, V. J.
Cognitive performance, sleep quality and mood during deep oxy-helium diving [RNP-1/81] N82-30920

LIANG, I. Y. S.
Effect of exercise conditioning on coronary resistance A82-44139

LIJNEN, P.
Hemodynamic response to converting enzyme inhibition at rest and exercise in humans
A82-44135

LITOVSKIY, I. A.
Efficacy of cimetidin in the prevention of ulcer formation in the stomach during immobilization stress
[NASA-TM-76864] N82-30923

LIVEPKA, M. E.
Possible use of magnetobiological effects in neurosurgery
N82-30905

LOGIS, R. H.
A trimix saturation dive to 660 meters: Studies of cognitive performance, mood and sleep quality [RPN-2/82] N82-31923

LOVE, J. T.
Implantable, remotely-programmable insulin infusion system [DE82-003084] N82-31927

M

MACHO, L.
Catecholamines and their enzymes in discrete brain areas of rats after space flight on biosatellites Cosmos [IAF PAPER 82-180] A82-44688

MAGDALENO, R. E.
A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limb, head and eyes
N82-30853

MAISKII, V. A.
The intracentral connections of the brain structures participating in cardiovascular control A82-43627

MAKAROV, P. N.
The morphology of the connections of the cortical vestibular zone A82-43611

MAKSIMOVA, I. N.
Cytogenetic effects of heavy charged particles of galactic cosmic radiation in experiments aboard Cosmos-1129 biosatellite N82-31912

MALDONADO, R. J.
Head cooling and heat A82-44292

MALINAUSKAYTE, L. D.
RNA accumulation in the body of neurons as an indicator of their functional deafferentation [NASA-TM-76850] N82-30922

MALKIN, P. J.
A comparison of display formats for the electronic master monitor and advisory display system [AD-A115127] N82-30946

MALOV, Y. S.
Effect of sensitization on development of stress gastric ulcers in rats [NASA-TM-76868] N82-30892

MALTSEV, N. A.
Liver microcirculation in normoxia and hypoxia A82-43638

MALYSHEV, V. V.
Activation of the cerebral gba-ergic inhibiting system in stress [NASA-TM-76867] N82-30881

MANGIN, P.
A command and control device for a man-machine system - Fabrication of a platform and trials A82-41699

MANUKHIN, B. N.
Biogenic monoamine content of the ganglia in the autonomic nervous system of rabbits during acute experimental emotional stress [NASA-TM-76900] N82-30875

MARCHENKOVA, L. N.
The effect of general vibration combined with intermittent noise on the human auditory function A82-42615

MARENKO, L. V.
A physiological justification of allowable noise levels in work involving heavy physical labor under nervous stress A82-42617

MARIANOVICH, A. T.
Methods of human adaptation to heat A82-42993

MARIN, A. M.
Early clinical manifestations of vibration-noise pathology in miners of Donets Basin A82-42616

MARKOV, KH. M.
The influence of prostaglandins and polyunsaturated fatty acids on the corticosteroid metabolism of normal and spontaneously hypertensive rats A82-42174

MARSHALLA, R. A.
An analytic framework for allocating R and D resources at GRI [PB82-168428] N82-30898

MASRIUKOVA, V. M.
Possible adaptation to strong magnetic fields [IAF PAPER 82-188] A82-44690

MATISONE, D. R.
Circulation and energetics of forearm muscles in man A82-42604

MATVEEVA, L. V.
Psychophysical characteristics of perception and bioelectric activity of the brain during micropolarization of the occipital part of the hemispheres A82-43235

MCDANIEL, W. C.
Improved procedures training through use of aids developed from learning guidelines [AD-A113109] N82-30939

MCHEDLISHVILLI, G. I.
Features and variations of the local hematocrit A82-42601

MCMAHON, M. L.
Three stimuli for visual motion perception compared A82-42900

MEDVEDEV, O. S.
An analysis of the role of endogenous opioid peptides in experimental hypertension A82-43629

MEERSON, P. Z.
Activation of lipid peroxidation during stress in man, evaluated according to the content of pentane in expired air A82-42600

Activation of the cerebral gba-ergic inhibiting system in stress [NASA-TM-76867] N82-30881

MEISELMAN, H. J.
Some potential blood flow experiments for space [UR-3490-1720] N82-32068

MELKUMOVA, G. G.
Brain-stem auditory evoked potentials in persons with normal hearing A82-43234

MELNIKOV, O. P.
Stimulating effect of exposure of rat sternum to variable magnetic field on antibody production in the spleen N82-30900

METGES, P. J.
The contribution of standard radiography in cardiovascular exploration during the examination of pilots N82-31935

MIAZNIKOV, V. I.
Psychophysiological performance examination onboard the orbital complex Salyut-Soyuz [IAF PAPER 82-171] A82-44686

MIKHAILOV, S. S.
The topography of elements of the cardiac conduction system A82-42625

MIKHAILOVA, G. P.
Liver microcirculation in normoxia and hypoxia A82-43638

MILLE, R. A.
A finite-state description of coordination in a two-handed target acquisition task A82-44514

Combined discrete network continuous control modelling of operator behavior N82-30861

MINKOVA, M. I.		
Effects of +G sub x acceleration and adenutron on nucleic acid content and other parameters of mouse peripheral blood		
	N82-31909	
MISUROVA, E.		
Changes in rat tissue deoxyribonucleoprotein and nucleic acids following flight aboard Cosmos-1129 biosatellite	N82-31907	
Deoxyribonucleoprotein and nucleic acid content of rat tissues after flight aboard Cosmos-936 biosatellite	N82-31921	
MITBREYT, I. M.		
Changes in peripheral circulation of limbs during bone regeneration under influence of low-frequency magnetic fields	N82-30906	
MITCHELL, R.		
Coatings for the prevention of macrofouling in the OTEC program [DE82-003238]	N82-30897	
MOCHALOV, O. IU.		
Physiological mechanisms determining the mechanical work of breathing for different types of muscular activity	A82-43237	
MOHR, G. A., JR.		
Logistics support productivity improvement	A82-42196	
MOHR, R. L.		
Modeling human target acquisition in ground-to-air weapon systems	N82-30836	
MOIBENKO, A. A.		
The coronary vessels and the contractile apparatus of the myocardium in immune heart damage /Histochemical and ultrastructural studies/	A82-42605	
Internal stresses and contractility of myocardium	A82-43513	
The mechanisms of the development of the cardiogenic vagosympathetic reflexes	A82-43631	
Heart antigens	A82-43666	
MONEY, K. E.		
Medical monitoring and therapy of space motion sickness [IAF PAPER 82-169]	A82-44684	
MONTY, D. E.		
A technique for long-term measurements of thyroid function in beagle dogs using iodine 125 [FOA-A-59003-H3]	N82-31890	
MOODIE, C. L.		
Life-cycle costing of life support equipment [AD-A116404]	N82-31948	
MORRIS, V. B., JR.		
Logistics support productivity improvement	A82-42196	
MOTAVKIN, P. A.		
A morphological investigation of the regulatory mechanisms of the intracerebral blood circulation.	A82-42627	
MOZIB, V. A.		
The dynamics of certain psychophysiological indicators under the cumulative effect of Coriolis accelerations	A82-42995	
MOZZBUKHIN, A. S.		
The effect of drugs altering the exchange of cAMP on the bioelectrogenesis of skeletal muscles	A82-43653	
MUKHIN, L. M.		
Interpretation of Viking biology experiments	A82-43221	
MULLEN, P. A.		
Prediction of short term tracking tasks using an optimal pilot model [AD-A115543]	N82-30940	
MURALIDHARAN, R.		
Procru: A model for analyzing flight crew procedures in approach to landing	N82-30863	
MURPHY, G. L.		
Habitability support for manned missions of space 2000 [IAF PAPER 82-170]	A82-44685	
MUSIYENKO, S. M.		
Changes in transcapillary metabolism in patients with chronic venous insufficiency of legs under influence of static magnetic fields	N82-30907	
N		
NAKHILNITSKAIA, Z. N.		
Possible adaptation to strong magnetic fields [IAF PAPER 82-188]	A82-44690	
NALAVADE, R. B.		
A finite-state description of coordination in a two-handed target acquisition task	A82-44514	
HALIMOV, T. A.		
Measurement of vestibular asymmetry in rotation tests	N82-31913	
HALIVAIKO, A. M.		
Changes in the lymphoid organs of rats under the effect of acute hypoxia	A82-42623	
HARINSKAYA, A. L.		
Main directions and principles of psychological expertise of cosmonauts	N82-31893	
Contrography used for integral assessment of mental work capacity	N82-31901	
NEKHOROSHEVA, M. A.		
Early clinical manifestations of vibration-noise pathology in miners of Donets Basin	A82-42616	
NELSON, J.		
Hyperoxia inhibits stimulated superoxide release by rat alveolar macrophages	A82-44143	
NESBITT, D. M.		
An analytic framework for allocating R and D resources at GRI [PB82-168428]	N82-30898	
NETUDYKHATKA, O. IU.		
Levels of physiological reserves of sailors working a 10-hour shift	A82-42618	
NEUMYAVKIN, I. P.		
Anesthesia, surgery and resuscitation during manned spaceflights	N82-31894	
NEVSTRUJEEVA, V. S.		
Effect of hypokinesia on some red blood indices and the condition of regulatory systems [NASA-TM-76752]	N82-30918	
NEVZODINA, L. V.		
Cytogenetic effects of heavy charged particles of galactic cosmic radiation in experiments aboard Cosmos-1129 biosatellite	N82-31912	
NEWMAN, R. L.		
Pilot reaction to attitude gyro failure: A flight experiment	N82-30858	
NICOGOSSIAN, A.		
Medical support and technology for long-duration space missions [IAF PAPER 82-174]	A82-44687	
NIKITINA, M. G.		
Meteorological radar as source of SHF electromagnetic field energy and problems of environmental hygiene	N82-30911	
NIKOLAEV, P. P.		
Factors determining the characteristics of the perception of stabilized retinal images	A82-43232	
NIKOLOV, I. T.		
Effects of +G sub x acceleration and adenutron on nucleic acid content and other parameters of mouse peripheral blood	N82-31909	
NINZ, N. R.		
Parametric identification of human operator models	N82-30842	
NOLAN, R. V.		
Investigation of behaviorally modified rats for use in explosives detection systems [AD-A114632]	N82-30895	

NOSKOV, V. B.
The effect of body position and the administration of a diuretic on the water-salt status and the activity of the kidneys A82-43238

NOVIKOVA, V. P.
Neurophysiological mechanisms of the compensation of motor disturbances in the presence of lesions of the pyramid system /An electromyographic analysis/ A82-42635

HUNNELEY, S. A.
Head cooling and heat A82-44292

NYGUE, D. D.
Thermography and microwave heating - The design and fabrication of systems intended for biological and medical use A82-42087

O

OBORNE, D. J.
Subjective response to whole-body vibration - The effects of posture A82-42831

Variability in human response to whole-body vibration - The effects of instructions A82-43675

OBUKHOVA, G. P.
The organization of the afferent subcortical inputs of the visual region of the cat cerebrum A82-42621

OGURTSOVA, O. S.
Effect of single exposure to microwaves on quantity and functional properties of T and B lymphocytes of guinea pig and mouse spleen N82-30913

OKSANEN-ROSSI, R.
Modification of training-induced responses by repeated norepinephrine injections in rats A82-44142

OLEARY, A.
Three stimuli for visual motion perception compared A82-42900

OLISOV, V. S.
Classification of pathological states of the stato-kinetic /vestibular/ analyzer A82-42630

OLLINGER, O.
Algal culture studies related to a Closed Ecological Life Support System (CELSS) [NASA-CR-166375] N82-30943

ONAN, C. M.
Medical monitoring and therapy of space motion sickness [IAF PAPER 82-169] A82-44684

ONAN, D. B.
An analytic framework for allocating R and D resources at GRI [PB82-168428] N82-30898

ONEILL, W. D.
Modeling of human operator dynamics in simple manual control utilizing time series analysis N82-30834

OPRSHALOVA, Z.
Catecholamines in the blood plasma of August and Wistar rats during emotional stress [NASA-TM-76872] N82-30885

Changes of blood plasma renin activity in August and Wistar rats under emotional stress [NASA-TM-76873] N82-30886

ORBETSOVA, V. T.
Effect of dosed physical loading on plasma and liver lipids and lipoproteins in rats A82-43045

Effect of dosed physical loading on biological oxidation and bioenergy in liver and myocardium A82-43046

ORLOV, O. N.
Activation of lipid peroxidation during stress in man, evaluated according to the content of pentane in expired air A82-42600

ORLOV, R. S.
The contraction, regulation, and functional role of lymph vessels A82-42603

ORLOV, S. L.
Interpretation of Viking biology experiments A82-43221

ORLOVA, T. R.
Analysis of load characteristics and development of new indicators of cardiac function A82-42606

OSAFO-CHARLES, F.
Modeling of human operator dynamics in simple manual control utilizing time series analysis N82-30834

OSAWA, T.
An experimental study of human pilot's scanning behavior N82-30841

OSTROVSKII, M. A.
Mechanisms of the damaging effect of light on retinal photoreceptors A82-43233

OTELLIN, V. A.
The morphology of the connections of the cortical vestibular zone A82-43611

OWEN, T.
Planetary atmospheres and the search for life [IAF PAPER 82-268] A82-44708

OZEROVA, O. Y.
Percutaneous measurement of partial oxygen tension and local blood flow in man during orthostatic test N82-31904

P

PAEGLITIS, A. O.
Circulation and energetics of forearm muscles in man A82-42604

The interrelationship between the pressor response and energy metabolism during isometric muscle contractions A82-43636

PALTSEV, IU. P.
Studies directed toward improving hygienic standards pertaining to total-body vibration resulting from heavy moving equipment A82-42619

PANOV, A. N.
Indices of the rat central nervous system metabolism during 36- and 60-day hypokinesia [NASA-TM-76870] N82-30883

PANTEV, T. P.
Effects of +G sub x acceleration and adenon on nucleic acid content and other parameters of mouse peripheral blood N82-31909

PARK, M. K.
Effect of heat stress on cutaneous vascular responses to the initiation of exercise A82-44146

PARSONS, H. H.
Human factors and robotics: Current status and future prospects [AD-A115042] N82-30945

PARSONS, K. C.
Vibration and comfort. I - Translational seat vibration A82-42829

Vibration and comfort. II - Rotational seat vibration A82-42830

Vibration and comfort. III - Translational vibration of the feet and back. IV - Application of experimental results A82-43674

PASTUKHOV, V. V.
Analysis of methods for evaluating thermal stress A82-42994

PATRIN, I. A.
The effect of drugs altering the exchange of cAMP on the bioelectrogenesis of skeletal muscles A82-43653

PAVLIUCHENKO, V. B.
The mechanisms of the development of the cardiogenic vagosympathetic reflexes A82-43631

PAVLOVA, V. I.
Activation of the cerebral gaba-ergic inhibiting system in stress [NASA-TM-76867] N82-30881

PESCHANSKIY, V. S.
Stereological analysis of rat bone tissue after flight aboard Cosmos-1129 biosatellite N82-31906

PESHEVA, M. T.
Effect of dosed physical loading on biological oxidation and bioenergy in liver and myocardium A82-43046

PETERSEN, C. C.
Life-cycle costing of life support equipment [AD-A116404] N82-31948

PETROVA, N. V.
Biogenic monoamine content of the ganglia in the autonomic nervous system of rabbits during acute experimental emotional stress [NASA-TM-76900] N82-30875

PEVTSOVA, E. I.
The participation of the hypothalamus in the regulation of parasympathetic cardiac reflexes in unanesthetized cats A82-43633

PHATAK, A. V.
Modeling human target acquisition in ground-to-air weapon systems N82-30836

PIGOLEKIN, IU. I.
A morphological investigation of the regulatory mechanisms of the intracerebral blood circulation A82-42627

PINKUS, A. R.
The effects of color and contrast on target recognition performance using monochromatic television displays [AD-A116238] N82-31946

PISARENKO, G. S.
Internal stresses and contractility of myocardium A82-43513

PLAKHUTA-PLAKUTINA, G. I.
Morphological distinctions of Macaca rhesus monkey thyroid under normal and various types of hypokinetic conditions N82-31908

PLUTESHKO, G. P.
Effect of sensitization on development of stress gastric ulcers in rats [NASA-TM-76868] N82-30892

POCHUKAYEVA, L. S.
Morphology and coagulant function of human blood system during long exposure to low ammonia concentrations in a sealed environment N82-31903

POGOMOLOV, V. V.
Anesthesia, surgery and resuscitation during manned spaceflights N82-31894

POKROVSKAIA, L. A.
The state of hemodynamics under the effect of laser radiation A82-42613

POKROVSKII, M. V.
Functional means for the regulation of heart rhythm during burst stimulation of the vagus nerves A82-43632

POKROVSKII, V. M.
Functional means for the regulation of heart rhythm during burst stimulation of the vagus nerves A82-43632

PONETS, I.
Catecholamines in the blood plasma of August and Mistar rats during emotional stress [NASA-TM-76872] N82-30885

PONOHAREVA, I. P.
Psychophysiological performance examination onboard the orbital complex Salyut-Soyuz [IAP PAPER 82-171] A82-44686

PONOHAREVA, V. L.
Experimental study of the combined effect of noise and acetone A82-42612

POOL, S. L.
Medical support and technology for long-duration space missions [IAP PAPER 82-174] A82-44687

POPOVICH, L. P.
The coronary vessels and the contractile apparatus of the myocardium in immune heart damage /Histochemical and ultrastructural studies/ A82-42605

PORTUGALOV, V. V.
Biogenic monoamine content of the ganglia in the autonomic nervous system of rabbits during acute experimental emotional stress [NASA-TM-76900] N82-30875

POSEY, J.
Life-cycle costing of life support equipment [AD-A116404] N82-31948

PRASLICKA, M.
Changes in rat tissue deoxyribonucleoprotein and nucleic acids following flight aboard Cosmos-1129 biosatellite N82-31907

Deoxyribonucleoprotein and nucleic acid content of rat tissues after flight aboard Cosmos-936 biosatellite N82-31921

PRILIPKO, L. L.
Activation of lipid peroxidation during stress in man, evaluated according to the content of pentane in expired air A82-42600

PROKHONCHUKOV, A. A.
Stereological analysis of rat bone tissue after flight aboard Cosmos-1129 biosatellite N82-31906

PUECH, M.
The contribution of standard radiography in cardiovascular exploration during the examination of pilots N82-31935

Q

QUAM, D. L.
Pilot reaction to attitude gyro failure: A flight experiment N82-30858

R

RADDIN, J. H., JR.
Dynamic preload as an impact protection concept A82-44290

RADMER, R. O.
Algal culture studies related to a Closed Ecological Life Support System (CELSS) [NASA-CR-166375] N82-30943

RADOMSKI, M. W.
Hormone response of normal and intermittent cold-preadapted humans to continuous cold A82-44137

RAGIMOV, S. R.
Analysis of load characteristics and development of new indicators of cardiac function A82-42606

RAGULIN, A. P.
Combined rehabilitation and therapeutic measures in space medicine N82-32283

RASHEVSKAYA, D. A.
Indices of the rat central nervous system metabolism during 36- and 60-day hypokinesia [NASA-TM-76870] N82-30883

RATNER, E. M.
Evaluation of the heaviness of physical work with marked nervous-emotional stress A82-43240

RATNER, E. V.
A physiological justification of allowable noise levels in work involving heavy physical labor under nervous stress A82-42617

READER, D. C.
Head cooling and heat A82-44292

REDKIN, A. P.
Experimental study of the combined effect of noise and acetone A82-42612

REED, H. J.
A comparison of display formats for the electronic master monitor and advisory display system [AD-A115127] N82-30946

REMES, P.
Psychophysiological performance examination onboard the orbital complex Salyut-Soyuz [IAF PAPER 82-171] A82-44686

REPEKHOVA, L. G.
Dehydration therapy for subjects exposed to simulated spaceflight conditions N82-31897

REPPERGER, D. W.
A performance analysis study of a complex G field experiment N82-30852

REUSHKIN, V. N.
Influence of hypokinesia on the content of electrolytes in animal organs [NASA-TM-76899] N82-30874

REUSHKINA, G. D.
Influence of hypokinesia on the content of electrolytes in animal organs [NASA-TM-76899] N82-30874
Effect of hypokinesia on some red blood indices and the condition of regulatory systems [NASA-TM-76752] N82-30918

RIBADEAU-DUMAS, C.
Examining arterial function by Doppler velocimetry: The advantage in aerospace medicine N82-31938

RIEDEL, S. A.
A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limb, head and eyes N82-30853

A comprehensive system model for motion/space sickness: Preliminary results N82-30855

RIZHINSKAYA, I. V.
Effect of single exposure to microwaves on quantity and functional properties of T and B lymphocytes of guinea pig and mouse spleen N82-30913

ROLLENHAGEN, C.
Reading text from visual display units [FOA-C-53006-H2] N82-31951

ROHANOV, V. S.
Specificity of ultrastructural changes in rat cardiomyocytes after local gamma-irradiation and hypokinesia [NASA-TM-76853] N82-30882

ROSCOE, A. H.
The airline pilot's view of flight deck workload: A preliminary study using a questionnaire [RAE-TM-FS(B)-465] N82-31945

ROSLYAKOV, N. P.
Influence of hypokinesia on the content of electrolytes in animal organs [NASA-TM-76899] N82-30874

ROTKOVSKA, D.
Effects of microwave radiation on mouse hemopoietic stem cells and on animal resistance to ionizing radiation N82-30912

ROUSE, S. H.
Design and evaluation of an onboard computer-based information system for aircraft A82-44512

ROUSE, W. B.
Design and evaluation of an onboard computer-based information system for aircraft A82-44512

A model of human decision making in multiple process monitoring situations N82-30862

ROZHANSKAYA, N. I.
An analysis of the role of endogenous opioid peptides in experimental hypertension A82-43629

ROZHKOVA, G. I.
Factors determining the characteristics of the perception of stabilized retinal images A82-43232

RUDAKOV, I. A.
Effect of single exposure to microwaves on quantity and functional properties of T and B lymphocytes of guinea pig and mouse spleen N82-30913

RUDAKOVA, S. P.
Effect of single exposure to microwaves on quantity and functional properties of T and B lymphocytes of guinea pig and mouse spleen N82-30913

RUDNEV, M. I.
Main directions of Soviet research on biological effects of microwave radiation N82-30914

RUDOV, A. I.
Stimulating effect of exposure of rat sternum to variable magnetic field on antibody production in the spleen N82-30900

RYABININ, V. I.
Effect of immobilization stress on diacyl- and plasmalogen-derivatives of phospholipids in various rat organs and tissues [NASA-TM-76852] N82-30891

RYKOV, V. A.
Morphological criteria for diagnosing pathologies of the thymus with myasthenia A82-42633

S

SABOVA, T.
Changes in rat tissue deoxyribonucleoprotein and nucleic acids following flight aboard Cosmos-1129 biosatellite N82-31907

SAGALOVICH, B. M.
Brain-stem auditory evoked potentials in persons with normal hearing A82-43234

SAHLIN, K.
Regulation of glycogenolysis in human muscle at rest and during exercise A82-44144

SAKHAROV, M. P.
Analysis of load characteristics and development of new indicators of cardiac function A82-42606

SALTYKOVA, V. A.
Effect of prolonged hypokinesia on resistance of resistive vessels in rats [NASA-TM-76849] N82-30878

SAMOILOV, V. O.
The effect of drugs altering the exchange of cAMP on the bioelectrogenesis of skeletal muscles A82-43653

SAMONINA, G. E.
The participation of the hypothalamus in the regulation of parasympathetic cardiac reflexes in unanesthetized cats A82-43633

SAMOSH, L. V.
Cytogenetic and gonadotoxic effects of static electric fields N82-30915

SANDERS, F. G.
Space telescope neutral buoyancy simulations: The first two years [NASA-TM-82485] N82-30942

SANKINA, T. V.
The dynamics of the development of postischemic cerebrovascular phenomena during the perfusion of the cerebral vessels with a stable volume of blood A82-42173

SANKINA, ZH. V.
The dynamics of the development of postischemic cerebrovascular phenomena during the perfusion of the cerebral vessels with a stable volume of blood A82-42173

SAPOVA, N. I.
A composite assessment of heart rhythm regulation during dosed functional loads A82-43637

SAVINA, Y. A.
Morphological distinctions of Macaca rhesus monkey thyroid under normal and various types of hypokinetic conditions N82-31908

SAVINKOV, A. B.
Measurement of vestibular asymmetry in rotation tests N82-31913

SCHULTIES, G.
Life-cycle costing of life support equipment [AD-A116404] N82-31948

SCOTT, P. G.
Improved procedures training through use of aids developed from learning guidelines [AD-A113109] N82-30939

SEARS, W. E., III
A computer simulation approach to measurement of human control strategy N82-30843

SEENE, T. P.
Role of the thyroid gland during adaptation of skeletal muscles to increased motor activity [NASA-TM-76871] N82-30884

SEIPERT, D. J.
Combined discrete network continuous control modelling of operator behavior N82-30861

SEIGNEURIC, A.
The exercise electrocardiogram N82-31933

Continuous ECG registration according to the Holter method N82-31934

SEMCHENKO, V. V.
Stereological analysis of interneuronal contacts in the cerebral cortex of rats during the posthypoxic period A82-42622

SEROVA, L. V.
Catecholamines and their enzymes in discrete brain areas of rats after space flight on biosatellites Cosmos [IAF PAPER 82-180] A82-44688

SHABAB, V. M.
The mechanisms of the development of the cardiogenic vagosympathetic reflexes A82-43631

SHABLOVSKAIA, O. V.
Heart antigens A82-43666

SHABOLINA, T. A.
Studies directed toward improving hygienic standards pertaining to total-body vibration resulting from heavy moving equipment A82-42619

SHAFIEV, A. I.
Interpretation of Viking biology experiments A82-43221

SHAFRAN, L. M.
Levels of physiological reserves of sailors working a 10-hour shift A82-42618

SHANDALA, M. G.
Main directions of Soviet research on biological effects of microwave radiation N82-30914

SHCHADRIK, V. E.
Factors determining the characteristics of the perception of stabilized retinal images A82-43232

SHEIKEH-ZADE, IU. R.
Functional means for the regulation of heart rhythm during burst stimulation of the vagus nerves A82-43632

SHEBIDAK, T. B.
Experimental evaluation of the concept of supervisory manipulation N82-30869

Supervisory control: Problems, theory and experiment for application to human-computer interaction in undersea remote systems [AD-A116236] N82-31949

SHIMKEVICH, L. L.
Formation of systemic adaptation reactions in static magnetic fields N82-30904

SHISHLO, M. A.
Formation of systemic adaptation reactions in static magnetic fields N82-30904

SHLAIN, V. A.
Analysis of load characteristics and development of new indicators of cardiac function A82-42606

SHMEL'VA, E. V.
Experimental study of the combined effect of noise and acetone A82-42612

SHUMOVA, L. Z.
Cytogenetic and gonadotoxic effects of static electric fields N82-30915

SHUTENKO, O. I.
Effects of superhigh frequency electromagnetic fields on animals of different ages N82-30916

SHVAYKO, I. I.
Effects of superhigh frequency electromagnetic fields on animals of different ages N82-30916

SIMONIAN, N. G.
Early clinical manifestations of vibration-noise pathology in miners of Donets Basin A82-42616

SINEVA, E. L.
Studies directed toward improving hygienic standards pertaining to total-body vibration resulting from heavy moving equipment A82-42619

SIMITSINA, T. A.
Effect of immobilization on the development of experimental arteriosclerosis in rabbits [NASA-TM-76901] N82-30876

SIVACHENKO, T. P.
Internal stresses and contractility of myocardium A82-43513

SKARDS, IIA. V.
Circulation and energetics of forearm muscles in man A82-42604

The interrelationship between the pressor response and energy metabolism during isometric muscle contractions A82-43636

SLUTSKY, A. S.
Factors inducing periodic breathing in humans - A general model A82-44140.

SMATRESK, N. J.
Aortic body chemoreceptor responses to dopamine, haloperidol, and pargyline A82-44136

SMIRICHEVSKII, L. D.
Effect of optokinetic stimulation on operator's functional state and professional work capacity N82-31896

SMIRNOVA, E. A.
Early clinical manifestations of vibration-noise pathology in miners of Donets Basin A82-42616

SMIRNOVA, E. P.
Possible adaptation to strong magnetic fields [IAF PAPER 82-188] A82-44690

Significance of magnetic field parameters to change in evoked bioelectric activity of the brain N82-31910

SMIRNOVA, R. S.
Morphological distinctions of Macaca rhesus monkey thyroid under normal and various types of hypokinetic conditions N82-31908

SMITH, E. L., III
Contrast increment thresholds of rhesus monkeys A82-43099

SNYDER, A. W.
Hyperacuity and interpolation by the visual pathways A82-43100

SOBOLEVVA, E. L.
New methodological aspects of the investigation of organ specificity of the lymphatic pathways A82-42602

SOKOLOV, E. I.
Electrocardiographic correlates of emotional stress A82-43236

SOKOLOVA, I. V.
System for automatic analysis of rheoencephalograms
N82-31916

SOKOLOVA, Z. A.
Chromatin of rat brain neurons and nucleic acids
of muscles as related to localization of
decimeter waves during exercise
N82-30908

STANKEVICH, K. I.
Cytogenetic and gonadotoxic effects of static
electric fields
N82-30915

STARR, G. P.
A comparison of control modes for time-delayed
remote manipulation
N82-30868

STAZHADZE, L. L.
Anesthesia, surgery and resuscitation during manned
spaceflights
N82-31894

Dehydration therapy for subjects exposed to
simulated spaceflight conditions
N82-31897

STENKO, IU. M.
Mental hygiene of sailors
A82-43602

STEPANOV, S. S.
Stereological analysis of interneuronal contacts
in the cerebral cortex of rats during the
posthypoxic period
A82-42622

STEPIN, V. A.
Combined rehabilitation and therapeutic measures
in space medicine
N82-32283

STONE, H. L.
Effect of exercise conditioning on coronary
resistance
A82-44139

STONE, J. M.
A technique for long-term measurements of thyroid
function in beagle dogs using iodine 125
[FOA-A-59003-H3]
N82-31890

STOYAN, I. P.
Main directions of Soviet research on biological
effects of microwave radiation
N82-30914

STROHL, K. P.
Factors inducing periodic breathing in humans - A
general model
A82-44140

STRZHZHOVSKII, A. D.
Possible adaptation to strong magnetic fields
[IAF PAPER 82-188]
A82-44690

SUDAKOV, K. V.
A systems analysis of individual vascular
reactions in animals under experimentally
induced emotional stress
A82-42610

Emotional stress as a factor in cardiovascular
disturbances
[NASA-TM-76910]
N82-30889

Genetic and individual differences in
cardiovascular disturbances of rats during
experimental emotional stress
[NASA-TM-76911]
N82-30890

New aspects of functional system theory
N82-30936

SUVOROV, I. M.
The state of hemodynamics under the effect of
laser radiation
A82-42613

SUZUKI, S.
Computer simulation of respiratory control system
A82-43145

SVETITSKII, P. V.
Distribution of heat in biological tissues under
influence of UHF electromagnetic fields
N82-30909

SVISTUNOV, B. T.
The effect of general vibration combined with
intermittent noise on the human auditory function
A82-42615

SWAIN, A. D.
Overview of a procedure for human-reliability
analysis
[DE81-030816]
N82-30947

SYROMIATNIKOV, IU. P.
Studies directed toward improving hygienic
standards pertaining to total-body vibration
resulting from heavy moving equipment
A82-42619

T

TAKAHASHI, J. S.
Regulation of circadian rhythmicity
A82-43383

TANAKA, K.
An experimental study of human pilot's scanning
behavior
N82-30841

An analytical prediction of pilot ratings
utilizing human pilot model
N82-30847

TASHPULATOV, R. IU.
Study of the morphological and biological
properties of obligate and facultative
psychrophilic bacteria found in the Antarctic
A82-43671

TAVADYAN, D. S.
Morphological distinctions of Macaca rhesus monkey
thyroid under normal and various types of
hypokinetic conditions
N82-31908

TAZETDINOV, I. G.
Cybernetic analysis of cardiac rhythm of Salyut-6
orbital station crew during graded exercise test
N82-32282

TENCHOVA, V. B.
Effects of +G sub x acceleration and adeutron on
nuclei acid content and other parameters of
mouse peripheral blood
N82-31909

TERBLANCHE, S. B.
Effects of beta-adrenergic receptor blockade on
glycogenolysis during exercise
A82-44133

TERENTEV, L. A.
Microcirculation during acute blood loss and hypoxia
A82-42997

THOMAS, D.
The role of the test pilot in flight tests
A82-43329

TIGRANIAN, R. A.
Catecholamines and their enzymes in discrete brain
areas of rats after space flight on
biosatellites Cosmos
[IAF PAPER 82-180]
A82-44688

TIGRANIAN, R. A.
Indices of the rat central nervous system
metabolism during 36- and 60-day hypokinesia
[NASA-TM-76870]
N82-30883

Changes in rat tissue deoxyribonucleoprotein and
nucleic acids following flight aboard
Cosmos-1129 biosatellite
N82-31907

Renin-angiotensin-aldosterone system and
electrolyte metabolism in rat blood after flight
aboard Cosmos-1129 biosatellite
N82-31918

Epinephrine and norepinephrine concentrations in
rat cardiac ventricles and atria after flight
aboard Cosmos-1129 biosatellite
N82-31919

Rat blood plasma corticosterone after flight
aboard Cosmos-1129 biosatellite
N82-31920

Deoxyribonucleoprotein and nucleic acid content of
rat tissues after flight aboard Cosmos-936
biosatellite
N82-31921

TIKHONCHUK, V. S.
Comparative analysis of the biological effects of
electromagnetic radiation. II - Eye damage.
Cataractogenesis
A82-43222

TINBAL, J.
The advantage of the tilt table test in examining
circulatory function
N82-31941

TIMOFEYEV, N. N.
Current problems in hypobiosis
A82-42171

TIZUL, A. I.
Combined rehabilitation and therapeutic measures in space medicine N82-32283

TKACHENKO, B. I.
The effectiveness of neurohumoral influences on pulmonary circulation A82-42607

TKHAK, CH. K.
The dynamics of the development of postischemial cerebrovascular phenomena during the perfusion of the cerebral vessels with a stable volume of blood A82-42173

TOBEY, R. A.
Biological availability of nickel arsenides:
Toxic effects of particulate Ni₅As₂ [DE82-000580] N82-30932

TOLEL, J. R.
FMP study of pilot workload. Qualification of workload via instrument scan [NASA-CR-169254] N82-30944

TOMASHEVSKAYA, L. A.
Meteoro logical radar as source of SHF electromagnetic field energy and problems of environmental hygiene N82-30911

TOMSOH, K. E.
Role of the thyroid gland during adaptation of skeletal muscles to increased motor activity [NASA-TM-76871] N82-30884

TORDA, T.
Catecholamines and their enzymes in discrete brain areas of rats after space flight on biosatellites Cosmos [IAF PAPER 82-180] A82-44688

TROUSDALE, F. R.
Hypoxic pulmonary vasoconstriction and the size of hypoxic compartment A82-44138

TRUBETSKOI, A. V.
Analysis of load characteristics and development of new indicators of cardiac function A82-42606

The responses of the coronary vessels in dogs to hypothalamic stimulation in acute and chronic experiments A82-43634

TRUFANOV, L. A.
Changes in transcapillary metabolism in patients with chronic venous insufficiency of legs under influence of static magnetic fields N82-30907

TSYRLIN, V. A.
The mechanisms of hypertensive responses during emotional stress A82-43630

TUBINSKAYA, N. L.
Indices of the rat central nervous system metabolism during 36- and 60-day hypokinesia [NASA-TM-76870] N82-30883

TURBASOV, V. D.
Comparative evaluation of informativeness of three corrected orthogonal leads and twelve conventional EKG leads in conducting functional tests N82-31914

U

UCHIYAMA, A.
Computer simulation of respiratory control system A82-43145

UDELNOV, M. G.
The participation of the hypothalamus in the regulation of parasympathetic cardiac reflexes in unanesthetized cats A82-43633

UDINTSEV, N. A.
Mechanism of biological effects of magnetic fields N82-30903

UMRIYUKHIM, Y. A.
Systemic mechanisms of human subconscious activity N82-30938

URENDA, R. S.
Implantable, remotely-programmable insulin infusion system [DE82-003084] N82-31927

USHAKOV, A. S.
Activation of lipid peroxidation during stress in man, evaluated according to the content of pentane in expired air A82-42600

USHKOVA, I. N.
The state of hemodynamics under the effect of laser radiation A82-42613

UTRIE, J. W., JR.
Inhibition of the rod-and-frame effect by circular contours A82-44824

V

VACEK, A.
Effects of microwave radiation on mouse hemopoietic stem cells and on animal resistance to ionizing radiation N82-30912

VAKHRAAEVA, I. A.
Sleep and motor activity: Stages of the ontogenetic evolution of the supraspinal motor control in the human sleep cycle A82-43607

VALDEZ, J. G.
Biological availability of nickel arsenides:
Toxic effects of particulate Ni₅As₂ [DE82-000580] N82-30932

VALDMAN, A. V.
An analysis of the role of endogenous opioid peptides in experimental hypertension A82-43629

VALENTINO, G. J.
Application of optimal control principles to describe the supervisory control behavior of AAA crew members N82-30864

VANHEES, L.
Hemodynamic response to converting enzyme inhibition at rest and exercise in humans A82-44135

VARSANOVICH, E. V.
Experimental study of the combined effect of noise and acetone A82-42612

VARSUKOVA, Z. V.
Cybernetic analysis of cardiac rhythm of Salyut-6 orbital station crew during graded exercise test N82-32282

VASILEVSKII, N. N.
The adaptive control of vegetative processes A82-43652

VASILYeva, T. D.
Regional hemodynamic changes after spaceflights lasting up to eight days N82-31895

VEIN, A. M.
Functional conditions of the brain and cerebral pathology A82-42634

VELLING, V. A.
Changes of the functional condition of the neocortex during direct application of optical radiation A82-43655

VELSKAIA, N. L.
Early clinical manifestations of vibration-noise pathology in miners of Donets Basin A82-42616

VENABLES, A.
Algal culture studies related to a Closed Ecological Life Support System (CELSS) [NASA-CR-166375] N82-30943

VETTES, B.
The advantage of the lower body negative pressure test in aerospace medicine N82-31942

Techniques for cardiovascular examination in human centrifuges and the principal results obtained N82-31943

VIALOV, A. B.
Studies directed toward improving hygienic standards pertaining to total-body vibration resulting from heavy moving equipment A82-42619

VIELLEFOND, H.
The advantage of the lower body negative pressure test in aerospace medicine N82-31942

VIKMANIS, M. M.
Techniques for cardiovascular examination in human centrifuges and the principal results obtained N82-31943

VIMOGRADEV, G. I.
Main directions of Soviet research on biological effects of microwave radiation N82-30914

VIRU, A. A.
Role of the thyroid gland during adaptation of skeletal muscles to increased motor activity [NASA-TM-76871] N82-30884

VITINS, T. A.
Renin-angiotensin-aldosterone system and electrolyte metabolism in rat blood after flight aboard Cosmos-1129 biosatellite N82-31918

VITOLIS, A. V.
The interrelationship between the pressor response and energy metabolism during isometric muscle contractions A82-43636

VITOLIS, E. A.
Possible use of magnetobiological effects in neurosurgery N82-30905

VITVITSKAIA, L. V.
The effect of a physiological load on the exchange and phosphorylation of cell membrane proteins in the brain of rats A82-43654

VITVITSKII, V. N.
The effect of a physiological load on the exchange and phosphorylation of cell membrane proteins in the brain of rats A82-43654

VIVAUDOU, H.
FMP study of pilot workload. Qualification of workload via instrument scan [NASA-CR-169254] N82-30944

VLADIMIROV, I. V.
Anesthesia, surgery and resuscitation during manned spaceflights N82-31894

VORONIN, N. N.
Principles of biological and medical climatology A82-42065

VOROZHTSOVA, S. V.
Cytogenetic effects of high-energy charged particles N82-31911

VYRENNOV, IU. E.
New methodological aspects of the investigation of organ specificity of the lymphatic pathways A82-42602

W

WAERE, Y.
Reading text from visual display units [FOA-C-53006-H2] N82-31951

WALLACH, H.
Three stimuli for visual motion perception compared A82-42900

WASHIZU, K.
An experimental study of human pilot's scanning behavior N82-30841

An analytical prediction of pilot ratings utilizing human pilot model N82-30847

WEAVER, D. L.
Diffusion mediated localization on membrane surfaces [NASA-CR-166386] N82-31888

WEI, K. C.
A gunner model for an AAA tracking task with interrupted observations N82-30835

WEVERINK, P. H.
The effect of visual information on the manual approach and landing N82-30837

WHITHAM, R. M.
Vibration and comfort. I - Translational seat vibration A82-42829

Vibration and comfort. III - Translational vibration of the feet and back. IV - Application of experimental results A82-43674

WILLIAMS, J. J.
Hyperoxia inhibits stimulated superoxide release by rat alveolar macrophages A82-44143

WILLIAMS, L. R.
Probabilistic methodology for estimating radiation induced cancer risk [DE82-001474] N82-31929

WILSON, O.
A technique for long-term measurements of thyroid function in beagle dogs using iodine 125 [FOA-A-59003-H3] N82-31890

WOHL, J. G.
Information automation and the Apollo program - A retrospective A82-44513

WOODWORTH, B. B.
An analog tracking filter for a swept-sine human vibration test A82-41808

Y

YABULLIN, K. K.
Regional hemodynamic changes after spaceflights lasting up to eight days N82-31895

System for automatic analysis of rheoencephalograms N82-31916

YEGOROV, A. D.
Combined rehabilitation and therapeutic measures in space medicine N82-32283

YEGOROVA, L. N.
Influence of stress on the blood system reaction in adrenalectomized mice [NASA-TM-76902] N82-30877

YOUNG, J. C.
Effects of beta-adrenergic receptor blockade on glycogenolysis during exercise A82-44133

YU, C. P.
A gunner model for an AAA tracking task with interrupted observations N82-30835

YUMATOV, Y. A.
Genetic and individual differences in cardiovascular disturbances of rats during experimental emotional stress [NASA-TM-76911] N82-30890

YURMANOV, V. A.
Meteorological radar as source of SHF electromagnetic field energy and problems of environmental hygiene N82-30911

Z

ZACHARIAS, G.
Procr: A model for analyzing flight crew procedures in approach to landing N82-30863

ZARUBA, L. A.
Reaction to hypokinesia and hyperkinesia of somatochrome neurons in the motor zone of the cerebral cortex in rabbits [NASA-TM-76885] N82-30925

ZASLOW, B. A.
Hypoxic pulmonary vasoconstriction and the size of hypoxic compartment A82-44138

ZATZ, M.
Regulation of circadian rhythmicity A82-43383

ZAYTSEV, Y.
Cooperative effort suggested for research on
extraterrestrial life N82-32284

ZAZHIVILOV, A. G.
Ear-nose-throat electrodiagnostic device for
determining the rheobase of human mucosa and skin
A82-42629

ZHITSA, V. T.
Microcirculatory state in the case of chronic
obliteration of arteries A82-42626

ZHUKOV, B. N.
Changes in transcapillary metabolism in patients
with chronic venous insufficiency of legs under
influence of static magnetic fields N82-30907

ZHUPAKHIN, K. S.
Meteorological radar as source of SHF
electromagnetic field energy and problems of
environmental hygiene N82-30911

ZHUYKO, V. I.
Regional hemodynamic changes after spaceflights
lasting up to eight days N82-31895

ZILOV, V. G.
Plastic properties of motivation as prime
component in systemic organization of purposeful
behavioral acts N82-30937

ZIMAKOVA, I. Y.
Effect of mebicar on animals under extreme
conditions [NASA-TM-76851] N82-30879

ZIMKIN, N. V.
The role of the extrapolation and dynamic
stereotype in the mechanism of the formation and
improvement of adequate motor coordination
A82-43651

ZVEREVA, G. S.
A physiological justification of allowable noise
levels in work involving heavy physical labor
under nervous stress A82-42617

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